MITSUBISHI ELECTRIC

SPLIT-TYPE, HEAT PUMP AIR CONDITIONERS

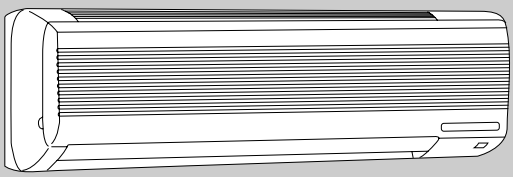
Revision:
- Information for connecting MSH-18NV-E4 with MXZ-32RV-E1 was described.
- TROUBLESHOOTING has been modified.

No. OB229
REVISED EDITION-A

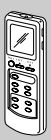
SERVICE MANUAL

Wireless type
Model

MSH-18NV -E4(WH) · MUH-18NV -E4



MSH-18NV -E4



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- Refer to the Service Manual OB185 REVISED EDITION C when MSH-18NV-E4 is connected with MXZ-32NV-E1 or MXZ-32NV-E2 as multi system units.
- Refer to the Service Manual OB227 REVISED EDITION-B when MSH-18NV-E4 is connected with MXZ-32RV-E1 as multi system units.

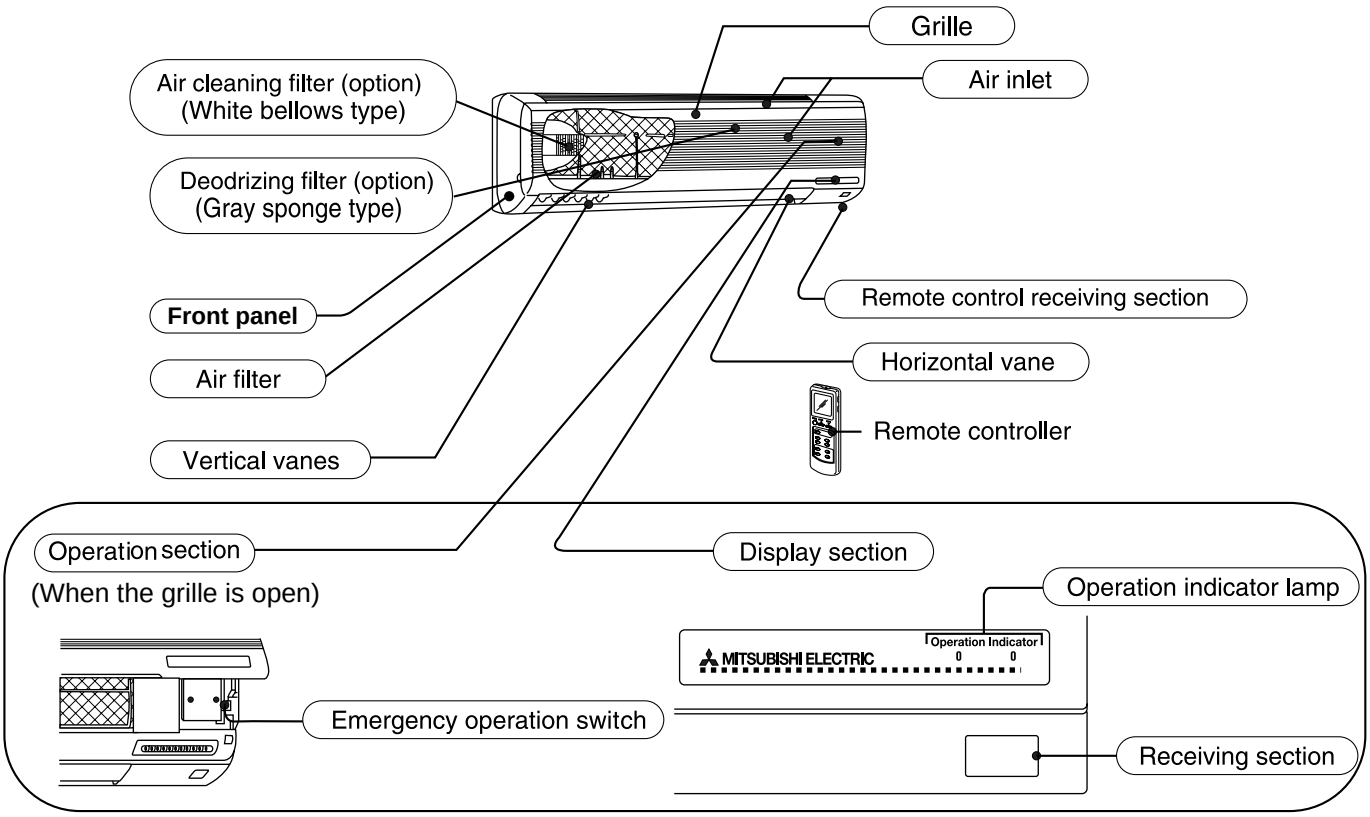
1 TECHNICAL CHANGES

MSH-18NV-E4 became possible the connection to MXZ-32RV-E1 as multi system units.

2 PART NAMES AND FUNCTIONS

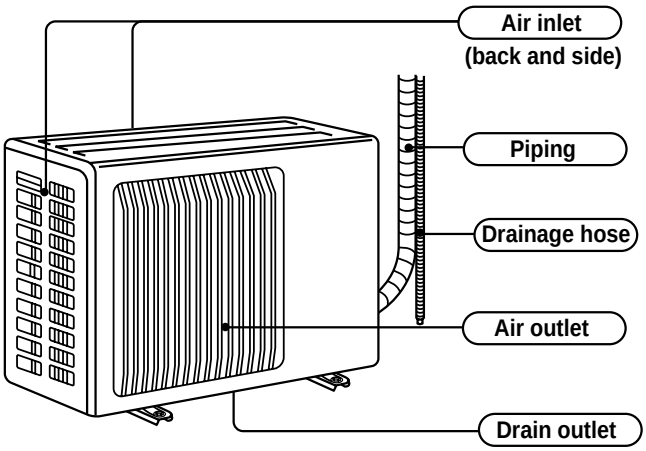
INDOOR UNIT

MSH-18NV -E4



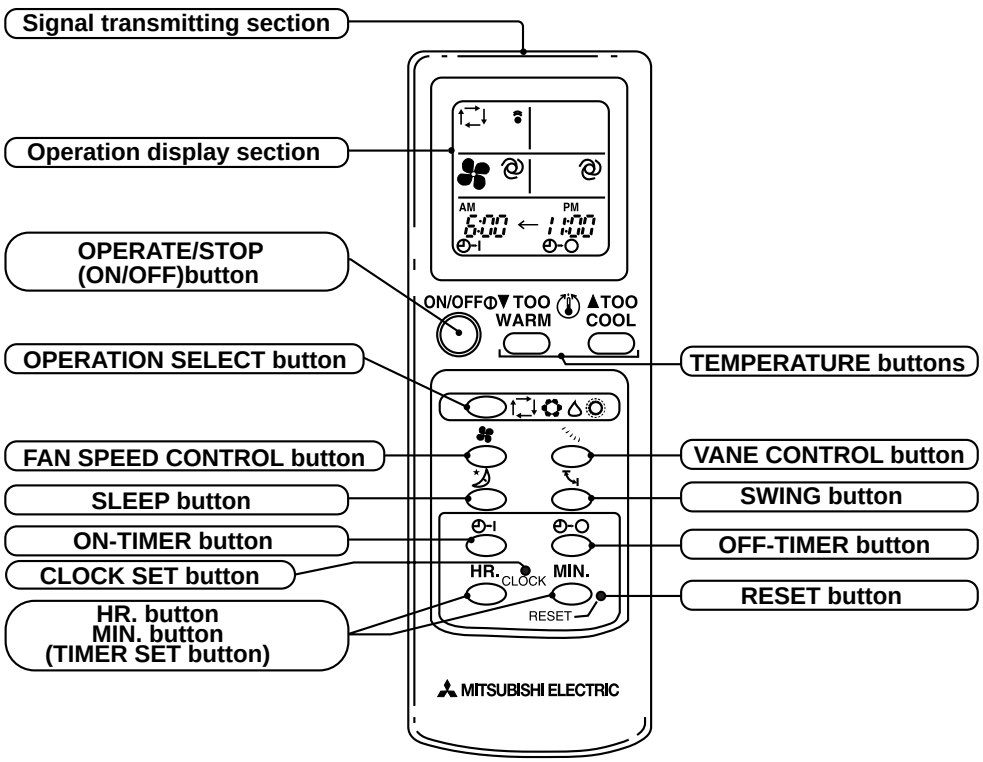
OUTDOOR UNIT

MUH-18NV -E4



REMOTE CONTROLLER

MSH-18NV -E4



3 SPECIFICATION

※Refer to the Service Manual OB185 REVISED EDITION C when MSH-18NV-E4 is connected with MXZ-32NV-E1 or MXZ-32NV-E2 as multi system units.
※Refer to the Service Manual OB227 REVISED EDITION-B when MSH-18NV-E4 is connected with MXZ-32RV-E1 as multi system units.

Model				MSH-18NV - E4		※MSH-18NV- E4 (INDOOR UNIT)	
Function				Cooling	Heating	Cooling	Heating
Power supply				Single phase,220-240V,50Hz		Single phase,220-240V,50Hz	
Capacity	Capacity		kW	5.1	5.4	—	—
	Dehumidification		ℓ /h	2.5	—	—	
	Air flow(Hi)		m³ /h	INDOOR 756 OUTDOOR 2142-2244		756	
Electrical data	Power outlet		A	15		10	
	Running current		A	9.4-9.2	9.2-9.0	0.28	
	Power input		W	2,030-2,120	1,980-2,070	60	
	Auxiliary heater		A(kW)	—	—	—	
	Power factor		%	98-96	98-96	97-89	
	Starting current		A	52-58		—	
	Compressor motor current		A	8.76-8.56	8.56-8.36	—	
	Fan motor current		A	INDOOR 0.25 OUTDOOR 0.39		0.25	
Coefficient of performance(C.O.P)				2.51-2.41	2.73-2.61	—	
Compressor	Model			PH-36VPET		—	
	Output		W	1600		—	
	Winding resistance(at20℃)		Ω	C-R1.03 C-S2.04		—	
Indoor fan motor	Model			RA4V27-EA or EF		RA4V27-EA or EF	
	Winding resistance(at20℃)		Ω	WHT-BLK183.8 BLK-RED250.5		WHT-BLK183.8 BLK-RED250.5	
Outdoor fan motor	Model			RA6V50-OF or OG		—	
	Winding resistance(at20℃)		Ω	WHT-BLK116.4 BLK-RED111.0		—	
Dimensions	Indoor unit	Width	mm	1,015		1,015	
		Height	mm	320		320	
		Depth	mm	190		190	
	Outdoor unit	Width	mm	850		—	
		Height	mm	605		—	
		Depth	mm	290		—	
Weight	Indoor unit		kg	14		14	
	Outdoor unit		kg	54		—	
Special remarks	Air direction			5		5	
	Sound level (Hi)	Indoor unit	dB	42		42	
		Outdoor unit	dB	52		—	
	Fan speed (Hi)	Indoor unit	rpm	1,180		1,180	
		Outdoor unit	rpm	810-845		—	
	Fan speed regulator	Indoor unit		4		4	
		Outdoor unit		1		—	
	Refrigerant filling capacity(R-22)		kg	1.65		—	
	Refrigerating oil (Model)		cc	900 (MS32N1)		—	
	Thermistor	RT11(at25℃)	kΩ	10		10	
		RT12(at25℃)	kΩ	10		10	
		RT61(at0℃)	kΩ	33.18		—	

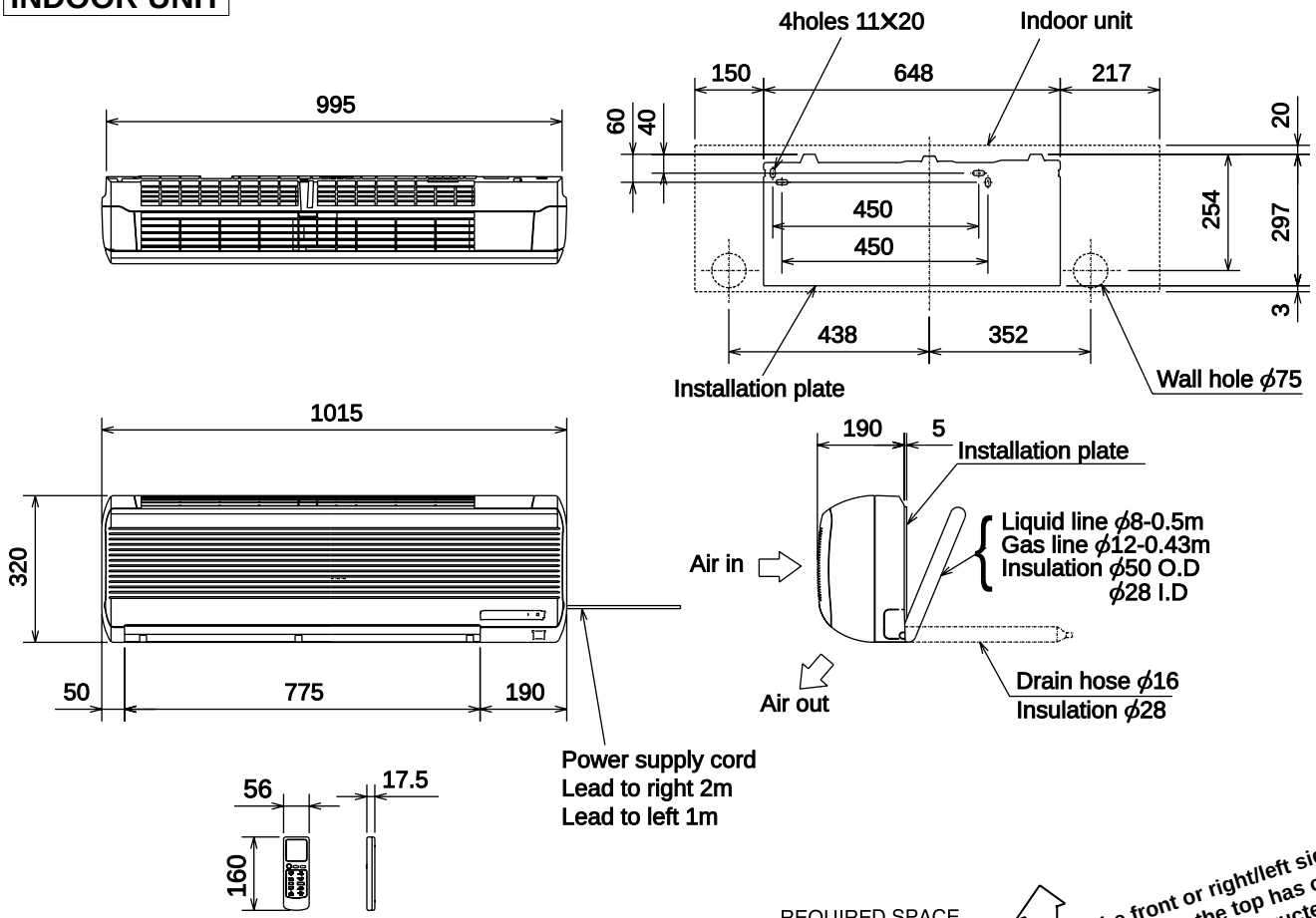
NOTE:Test conditions
Cooling : Indoor DB27°C / WB19°C
Outdoor DB35°C / WB24°C
Heating : Indoor DB20°C /WB15.5°C
Outdoor DB7°C / WB6°C

4 OUTLINES AND DIMENSIONS

Unit: mm

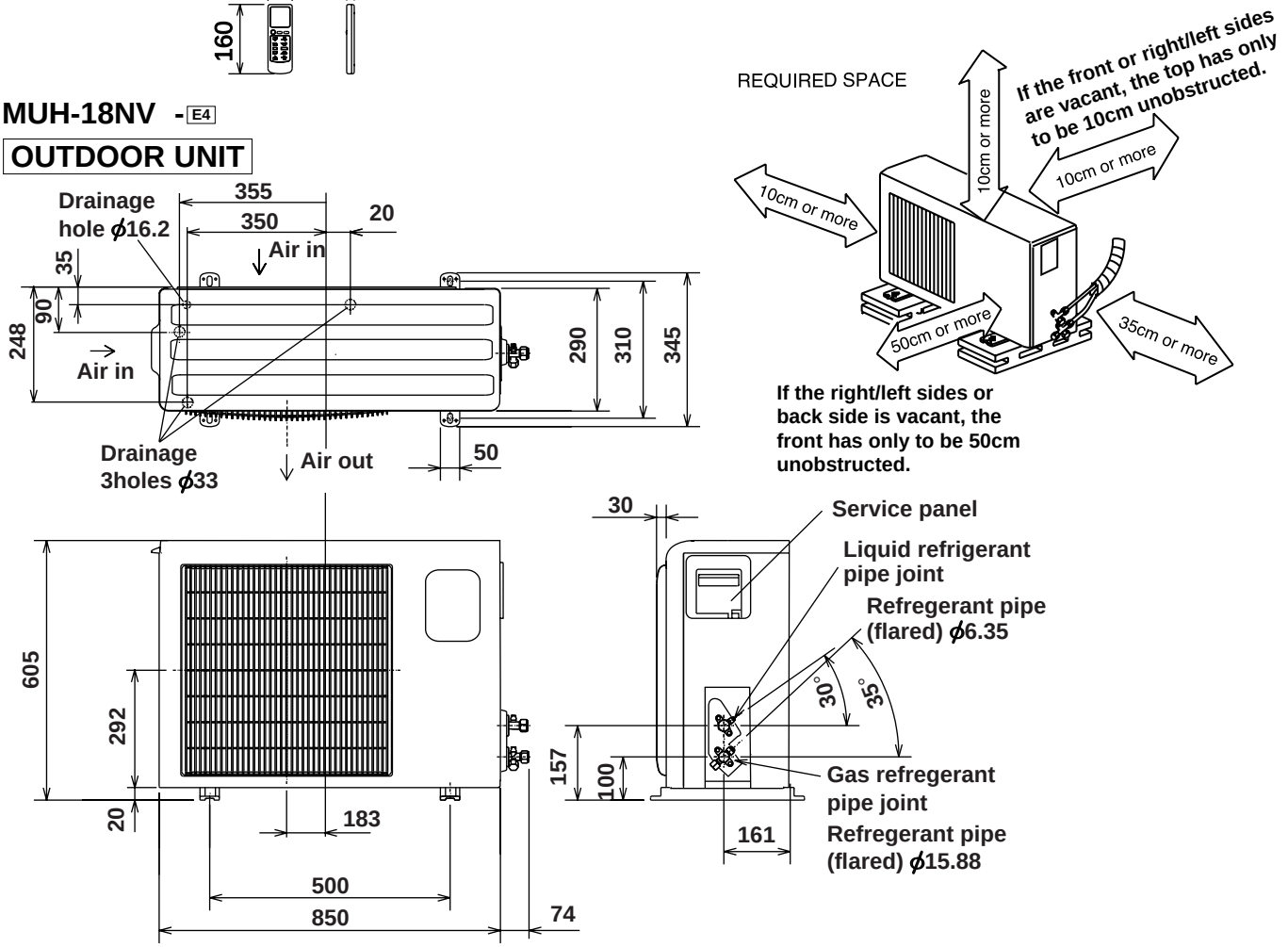
MSH-18NV -E4

INDOOR UNIT



MUH-18NV -E4

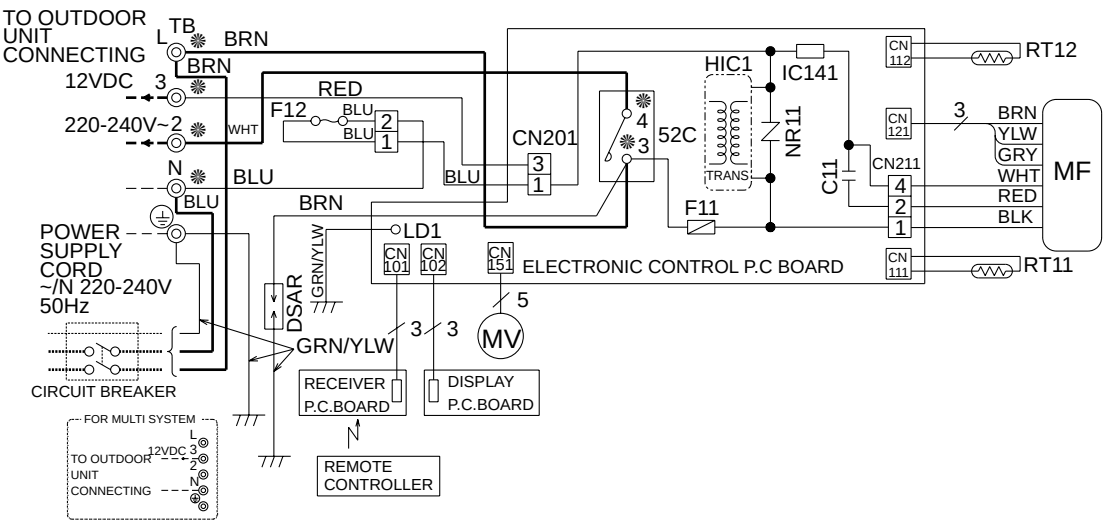
OUTDOOR UNIT



5 WIRING DIAGRAM

MSH-18NV -E4 MODEL WIRING DIAGRAM

INDOOR UNIT

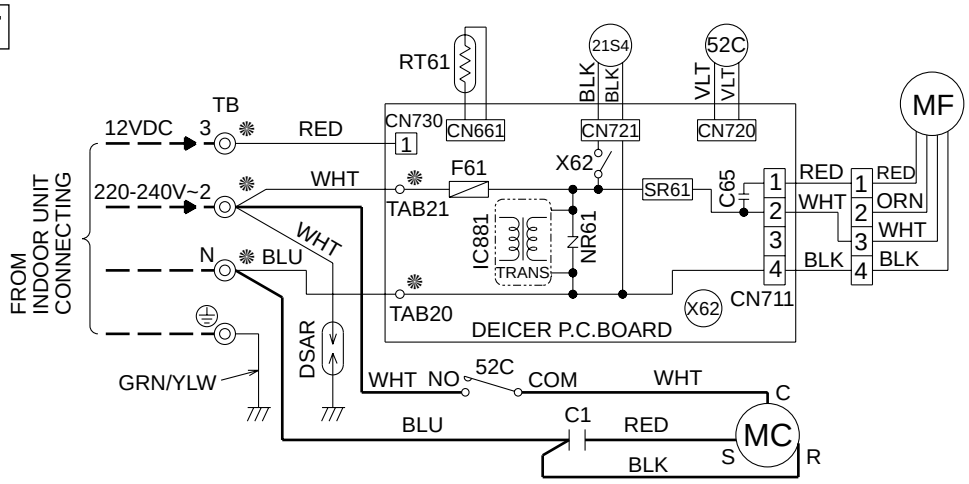


SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C11	INDOOR FAN CAPACITOR	HIC1	DC/DC CONVERTER	RT12	INDOOR COIL THERMISTOR
DSAR	SURGE ABSORBER	MF	INDOOR FAN MOTOR(INNER FUSE)	TB	TERMINAL BLOCK
F11	FUSE(3.15A)	MV	VANE MOTOR	52C	CONTACTOR
F12	THERMAL FUSE(93℃)	NR11	VARISTOR		
IC141	HYBRID IC	RT11	ROOM TEMPERATURE THERMISTOR		

NOTE:1. For the outdoor electric wiring refer to the outdoor unit electric wiring diagram for servicing.
2. Use copper conductors only.(For field wiring)
3. Symbols below indicate.
◎: Terminal block, □□□□: Connector

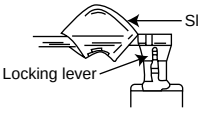
MUH-18NV -E4 MODEL WIRING DIAGRAM

OUTDOOR UNIT



SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C1	COMPRESSOR CAPACITOR	MC	COMPRESSOR(INNER THERMOSTAT)	TB	TERMINAL BLOCK
C65	OUTDOOR FAN CAPACITOR	MF	OUTDOOR FAN MOTOR(INNER THERMOSTAT)	X62	REVERSING VALVE COIL RELAY
DSAR	SURGE ABSORBER	NR61	VARISTOR	21S4	REVERSING VALVE COIL
F61	FUSE(2A)	RT61	DEFROST THERMISTOR	52C	CONTACTOR
IC881	DC/DC CONVERTER	SR61	SOLID STATE RELAY		

NOTE: 1. Use copper conductors only (For field wiring).
2. Symbols below indicate.
◎: Terminal block,□□□□: Connector
3. "❋"show the terminals with a lock mechanism, so they cannot be removed when you pull the lead wire.
Be sure to pull the wire by pushing the locking lever (projected part) of the terminal with a finger.

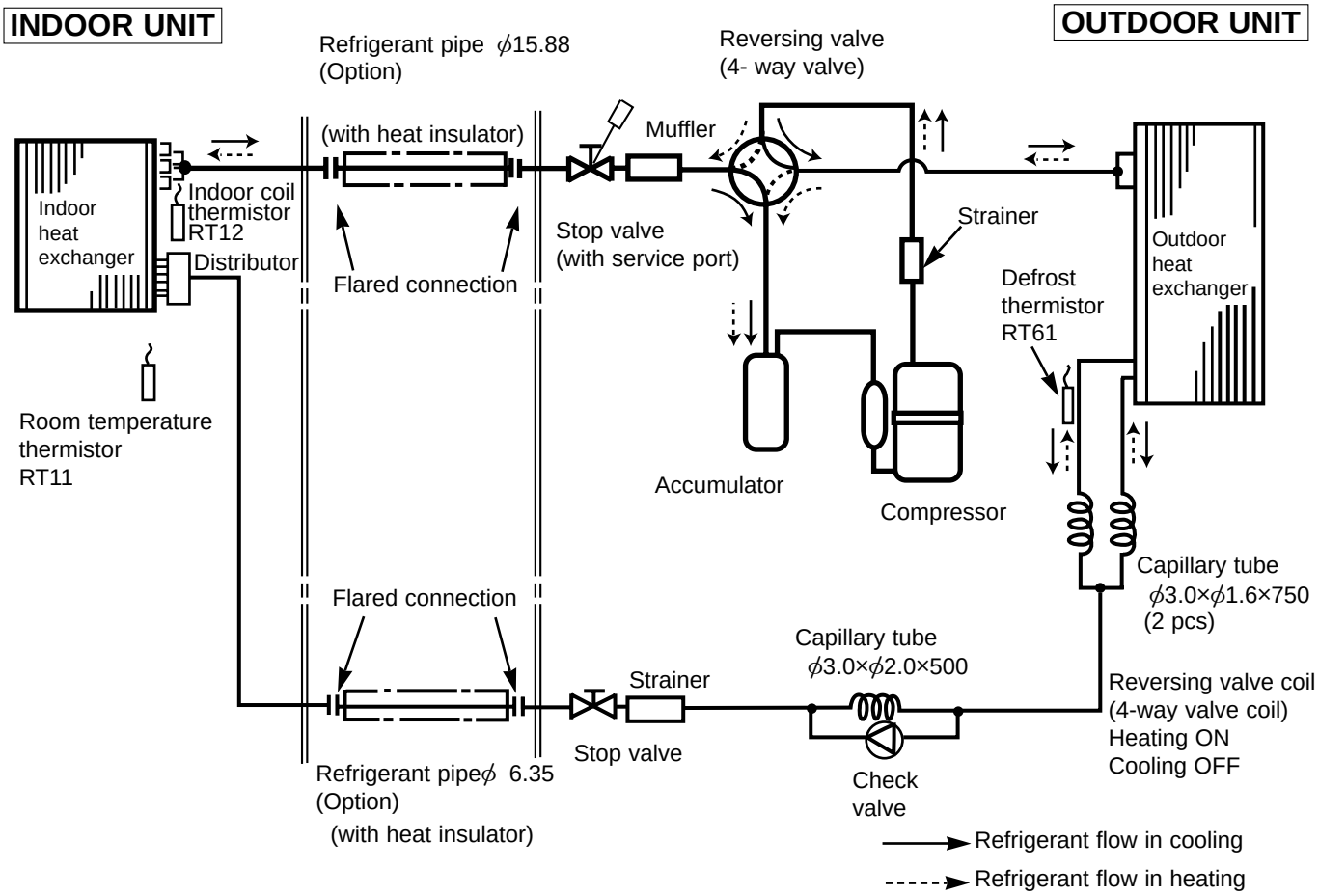


1.Slide the sleeve.
2.Pull the wire while pushing the locking lever.

6 REFRIGERANT SYSTEM DIAGRAM

MSH-18NV -E4 **MUH-18NV -E4**

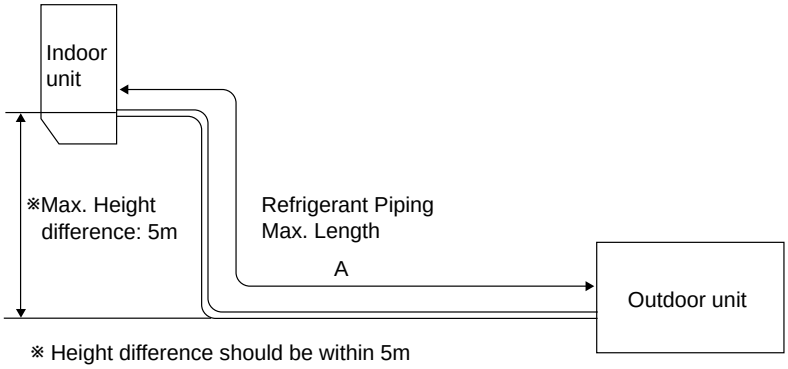
INDOOR UNIT **OUTDOOR UNIT**



MAX. REFRIGERANT PIPING LENGTH

Model	Refrigerant piping Max. length : m	Piping size O.D : mm		Length of connecting pipe : m	
	A	Gas	Liquid	Indoor unit	Outdoor unit
MSH-18NV - E4	15	15.88	6.35	Gas 0.43 Liquid 0.5	Gas 0 Liquid 0

MAX. HEIGHT DIFFERENCE



※ Height difference should be within 5m
regardless of which unit, indoor or outdoor position is high.

ADDITIONAL REFRIGERANT CHARGE(R-22 : g)

Model	Outdoor unit precharged (up to 7m)	Refrigerant piping length (one way)		
		7m	10m	15m
MSH-18NV - E4	1650	0	150	400

Calculation : Xg=50g/m X (A-7)m

7 PERFORMANCE CURVES

MSH-18NV - E4

The standard data contained in these specifications apply only to the operation of the air conditioner under normal conditions, since operating conditions vary according to the areas where these units are installed. The following information has been provided to clarify the operating characteristics of the air conditioner under the conditions indicated by the performance curve.

(1) GUARANTEED VOLTAGE

Rated voltage : ±10% (198 ~ 264V), 50Hz

(2) AIR FLOW

Air flow should be set at MAX.

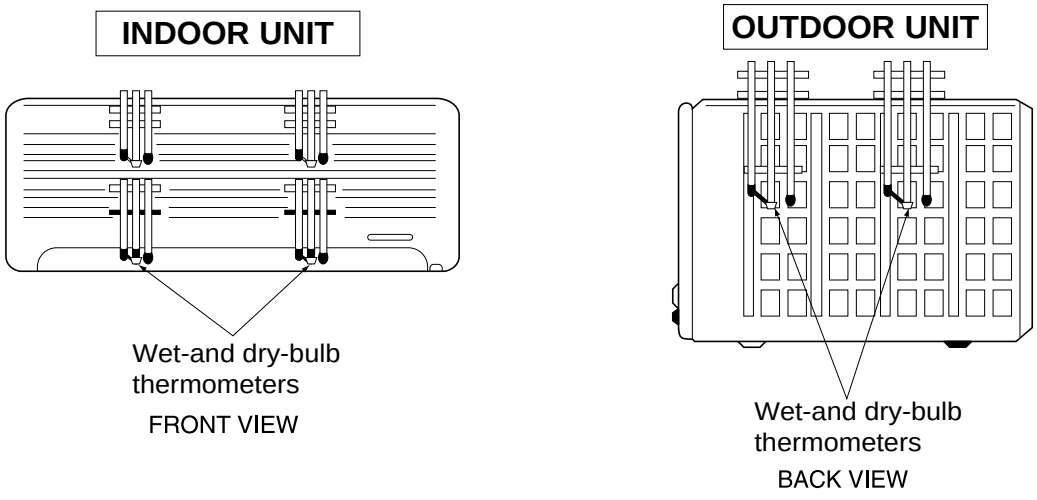
(3) MAIN READINGS

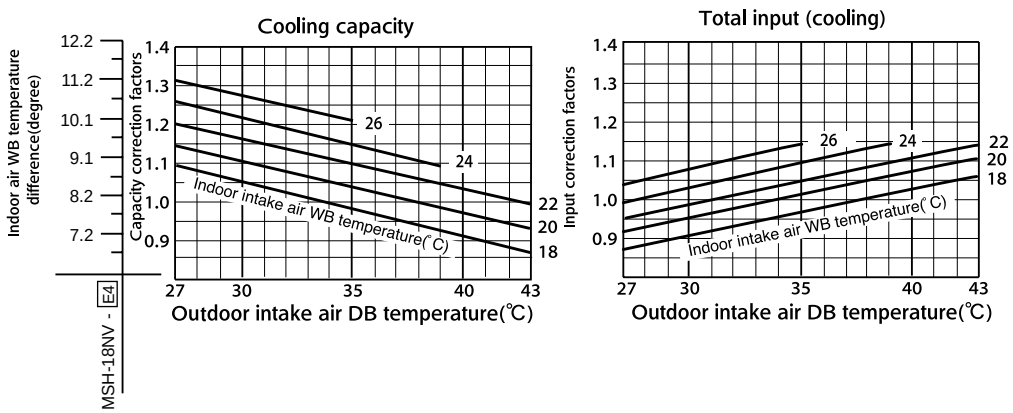
(1) Indoor intake air wet-bulb temperature :	°CWB	Cooling
(2) Indoor outlet air wet-bulb temperature :	°CWB	
(3) Outdoor intake air dry-bulb temperature :	°CDB	
(4) Total input:	W	
(5) Indoor intake air dry-bulb temperature :	°CDB	Heating
(6) Outdoor intake air wet-bulb temperature :	°CWB	
(7) Total input :	W	

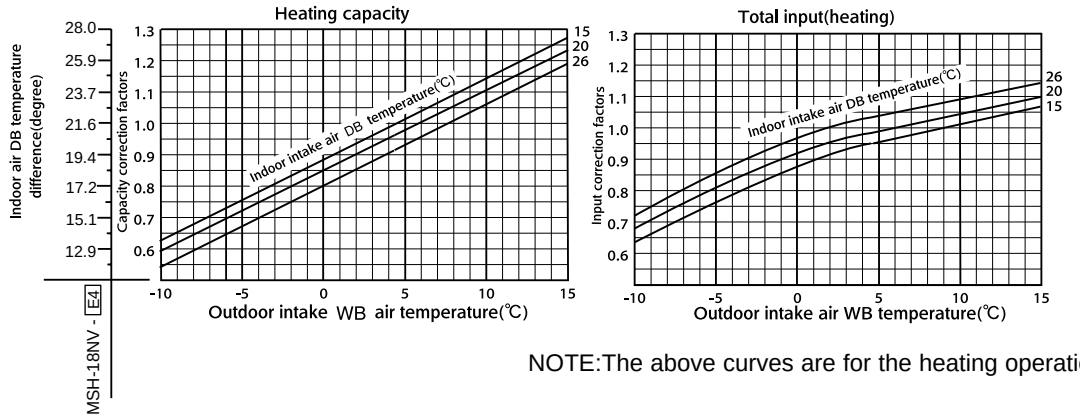
Indoor air wet/dry-bulb temperature difference on the left side of the chart on this page and next page shows the difference between the indoor intake air wet/dry-bulb temperature and the indoor outlet air wet/dry-bulb temperature for your reference at service.

How to measure the indoor air wet-bulb/dry-bulb temperature difference

1. Attach at least 2 sets of wet-and dry-bulb thermometers to the indoor air intake as shown in the figure, and at least 2 sets of wet-and dry-bulb thermometers to the indoor air outlet. The thermometers must be attached to the position where air speed is high.
2. Attach at least 2 sets of wet-and dry-bulb thermometers to the outdoor air intake. Cover the thermometers to prevent direct rays of the sun.
3. Check that the air filter is cleaned.
4. Open windows and doors of room.
5. Press the EMERGENCY OPERATION switch once(twice) to start the EMERGENCY COOL(HEAT) MODE.
6. When system stabilizes after more than 15 minutes, measure temperature and take an average temperature.
7. 10 minutes later, measure temperature again and check that the temperature does not change.







NOTE:The above curves are for the heating operation without any frost.

OUTDOOR LOW PRESSURE AND OUTDOOR UNIT CURRENT

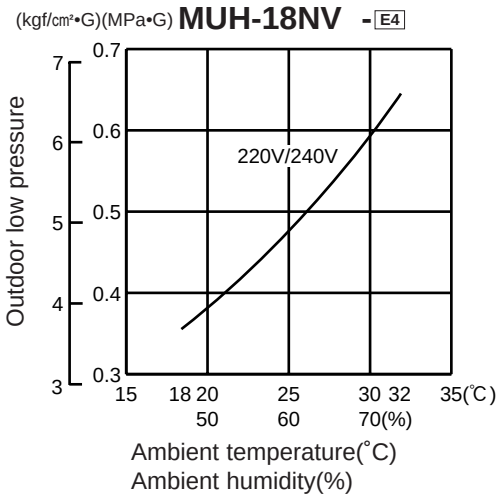
COOL operation

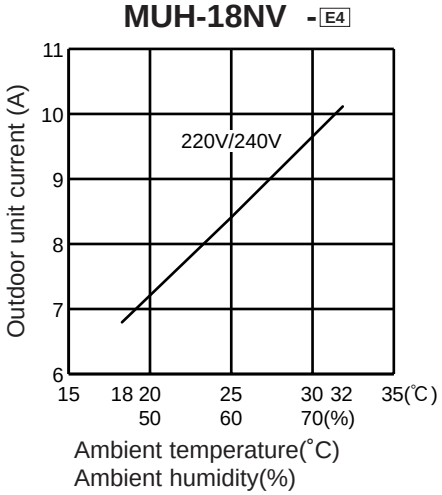
① Both indoor and outdoor unit are under the same temperature/humidity condition.

Dry-bulb temperature	Relative humidity(%)
20	50
25	60
30	70

② Air flow should be set at MAX.

③ The unit of pressure has been changed to MPa on the international system of units(SI unit system).
The conversion factor is : **1(MPa • G) =10.2(kgf/㎠ • G)**

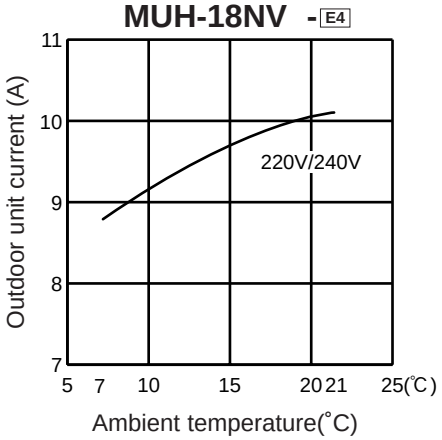




HEAT operation

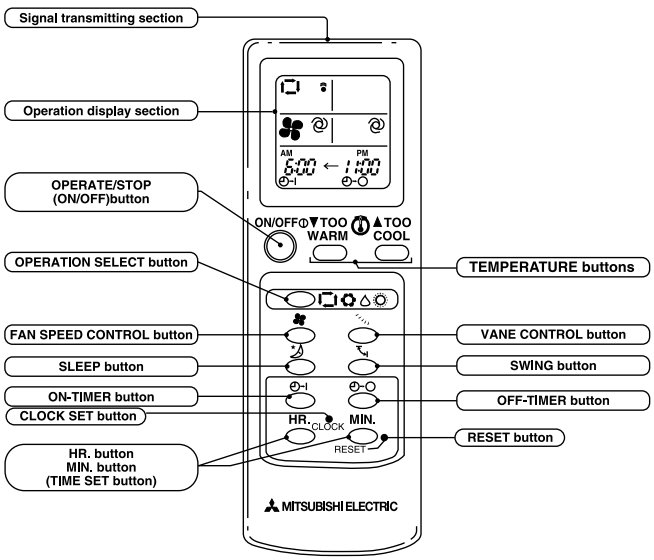
Condition indoor:Dry bulb temperature 20.0°C
Wet bulb temperature 14.5°C

Outdoor:Dry bulb temperature 7,15,20°C
Wet bulb temperature 6,12,14.5°C



8 MICROPROCESSOR CONTROL

WIRELESS REMOTE CONTROLLER



MSH-18NV -E4

Once the operation mode are set, the same operation mode can be repeated by simply turning the OPERATE/STOP (ON/OFF) button ON.
Indoor unit receives the signal with a beep tone.
When the system turns off, 3-minute time delay will operate to protect system from overload and compressor will not restart for 3 minutes.

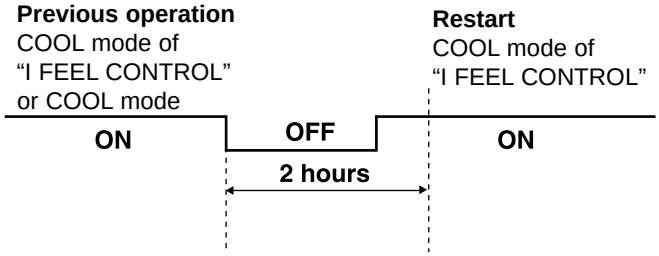
8-1. "I FEEL CONTROL" (▭) OPERATION

(1) Press OPERATE/STOP (ON/OFF) button on the remote controller. Operation Indicator lamp of the indoor unit turns on with a beep tone.
(2) Press OPERATION SELECT button to set "I FEEL CONTROL"(▭). Then a beep tone is heard.
(3) The operation mode is determined by the room temperature at start-up of the operation.

Initial room temperature	Mode
25℃ or more	COOL mode of "I FEEL CONTROL"
23℃ to 25℃	DRY mode of "I FEEL CONTROL"
less than 23℃	HEAT mode of "I FEEL CONTROL"

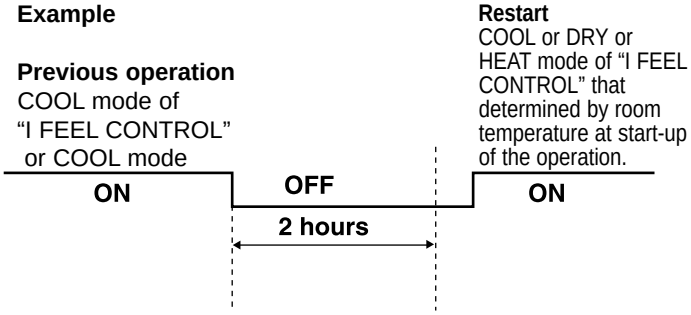
- Once the mode is fixed, the mode does not change by room temperature afterwards.
- Under the ON-TIMER (◴→|) operation, mode is determined according to the room temperature as the operation starts.
- When the system is stopped with the OPERATE/STOP (ON/OFF) button on the remote controller, and restarted within 2 hours in "I FEEL CONTROL" (▭) mode, the system operates in previous mode automatically regardless of the room temperature.

Example



When the system is restarted after 2 hours and more, the operation mode is determined by the room temperature at start-up of the operation.

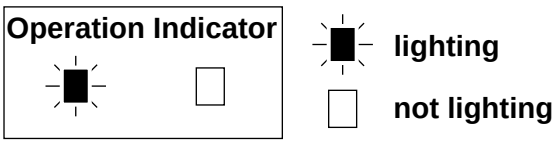
Example



INDOOR UNIT DISPLAY SECTION

Operation Indicator lamp

The operation indicator at the right side of the indoor unit indicates the operation state.



Indication	Operation state	Difference betweeen set temperature and room temperature
■ ■	This shows that the air conditioner is operating to reach the target temperature. Please wait unit the target temperature is obtained.	Approx. 2 ℃ or more
■ □	This shows that the room temperature is approaching the target temperature.	Approx. 2 ℃ or less

(4) The initial set temperature is decided by the initial room temperature.

Model	Initial room temperature	Initial set temperature	
COOL mode of "I FEEL CONTROL"	26℃ or more	24℃	✵1
	25℃ to 26℃	Initial room temperature minus 2℃	
DRY mode of "I FEEL CONTROL"	23℃ to 25℃	Initial room temperature minus 2℃	
HEAT mode of "I FEEL CONTROL"	less than 23℃	26℃	

✵1 When the system is restarted with the remote controller, the system operates with the previous set temperature regardless of room temperature at restart.
The set temperature is calculated by the previous set temperature.

(5) TEMPERATURES buttons

In "I FEEL CONTROL" (▭) mode, set temperature is decided by the microprocessor based on the room temperature. In addition, set temperature can be controlled by TOO WARM or TOO COOL buttons when you feel too cool or too warm. Each time the TOO WARM or TOO COOL button is pressed,the indoor unit receives the signal and emits a beep tone.

- **Fuzzy control**

When the TOO COOL or TOO WARM button is pressed, the microprocessor changes the set temperature, considering the room temperature, the frequency of pressing TOO COOL or TOO WARM button and the user's preference to heat or cool. So this is called "Fuzzy control", and works only in "I FEEL CONTROL" mode.
In DRY mode of "I FEEL CONTROL", the set temperature doesn't change.

▲ TOO
COOL ⋯ To raise the set temperature 1~2 degrees(°C)

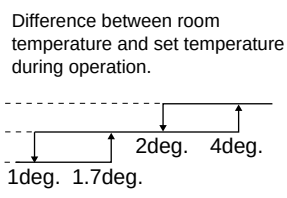
▼ TOO
WARM ⋯ To lower the set temperature 1~2 degrees(°C)

— COOL mode of "I FEEL CONTROL" —

1. Indoor fan speed control

Indoor fan operates at the set speed by FAN SPEED CONTROL button.
In AUTO the fan speed is as follows.

Initial temperature difference	Fan Speed
Room temperature minus set temperature : 2 degrees or more	Hi
Room temperature minus set temperature : Between 1 and 2 degrees	Me
Room temperature minus set temperature : less than 1 degree	Lo



2. Coil frost prevention

① Temperature control

When the indoor coil thermistor RT12 reads 3°C or below, the coil frost prevention mode starts immediately. However, the coil frost prevention doesn't work for 5 minutes since the compressor has started. The indoor fan operates at the set speed and the compressor stops for 5 minutes. After that, if RT12 still reads below 3°C this mode prolonged until the RT12 reads over 3°C.

② Time control

When the three conditions as follows have been satisfied for 1 hour and 45 minutes, compressor stops for 3 minutes.

a. Compressor has been continuously operating.

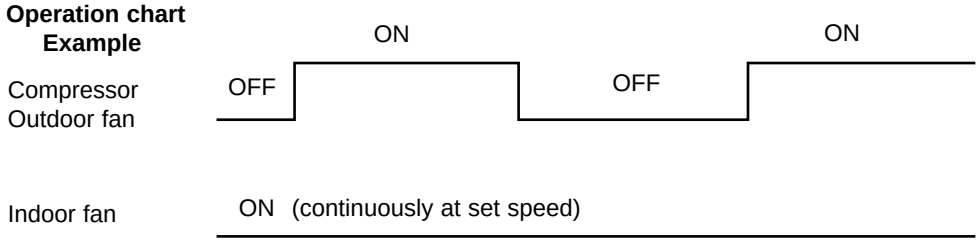
b. Indoor fan speed is Lo or Me.

c. Room temperature is below 26°C.

When compressor stops, the accumulated time is cancelled and when compressor restarts, time counting starts from the beginning.

Time counting also stops temporarily when the indoor fan speed becomes Hi or the room temperature exceeds 26°C.However, when two of the above conditions (b.and c.) are satisfied again.Time accumulation is resumed.

Operation chart
Example



—DRY mode of "I FEEL CONTROL"—

The system for dry operation uses the same refrigerant circuit as the cooling circuit.

The compressor and the indoor fan are controlled by the room temperature.

By such controls, indoor flow amounts will be reduced in order to lower humidity without much room temperature decrease.

1. Indoor fan speed control

Indoor fan operates at the set speed by FAN SPEED CONTROL button.

However, in AUTO fan operation, fan speed becomes Lo.

2. The operation of the compressor and indoor/ outdoor fan

Compressor operates by room temperature control and time control.

Set temperature is controlled to fall 2°C from initial room temperature.

Indoor fan and outdoor fan operate in the same cycle as the compressor.

•When the room temperature is 23°C or over:

When the thermostat is ON, the compressor repeats 8 minutes ON and 3 minutes OFF.

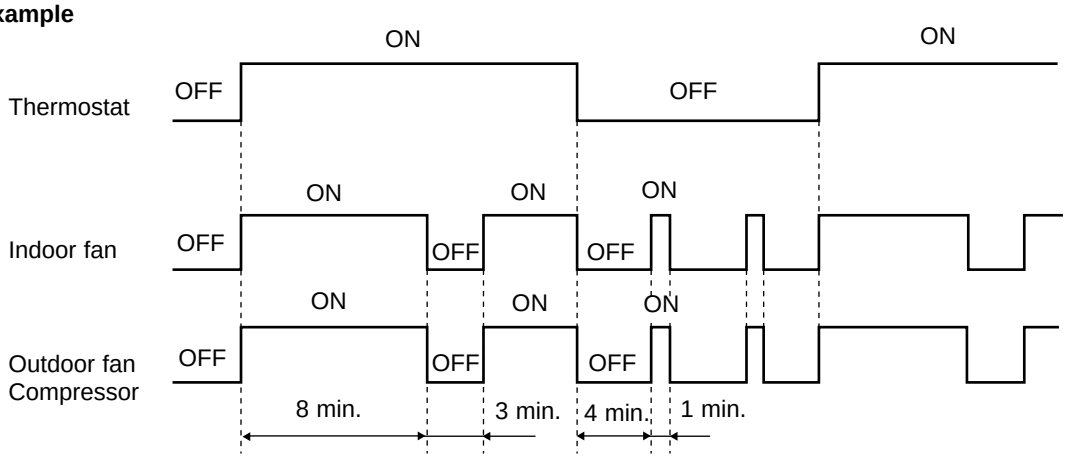
When the thermostat is OFF, the compressor repeats 4 minutes OFF and 1 minute ON.

•When the room temperature is under 23°C.

When the thermostat is ON, the compressor repeats 2 minutes ON and 3 minutes OFF.

When the thermostat is OFF, the compressor repeats 4 minutes OFF and 1 minute ON.

Operation time chart
Example



3. Coil frost prevention

- The operation is as same as coil frost prevention during COOL mode of "I FEEL CONTROL".
- Indoor fan operates at the set speed and the compressor stops for 5 minutes, because protection(Coil frost prevention) has the priority.

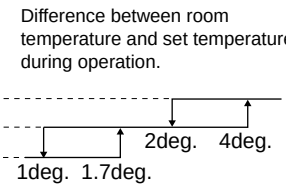
  However, when coil frost prevention works while the compressor is not operating, it's speed becomes Lo.

— HEAT mode of "I FEEL CONTROL" —

1. Indoor fan speed control

(1) In AUTO the fan speed is as follows.

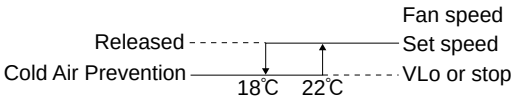
Initial temperature difference	Fan speed
Set temperature minus room temperature: 2 degrees or more	Hi
Set temperature minus room temperature: Between 1 and 2 degrees	Me
Set temperature minus room temperature: less than 1 degree	Lo



(2) Cold air prevention control

The fan runs at set speed when the indoor coil thermistor RT12 temperature exceeds 22°C. The fan operates at VLo when the temperature of indoor coil thermistor RT12 is below 18°C. But the fan stops when the indoor fan operates at VLo and the room temperature is 15°C or less.

NOTE : At initial in hysteresis this control works.



(3) Warm air control.

When compressor starts in heating operation or after defrosting, the fan changes the speed due to the indoor coil thermistor RT12 temperature to blow out warm air.

After releasing of cold air prevention, when the indoor coil temperature is 37°C or above, the fan speed shifts to the set speed, and when the fan speed is changed by the remote controller, the fan speed is the set speed.

When the indoor coil temperature is less than 37°C, the fan speed is controlled by time as below.

<Time condition>	<Indoor fan speed>
less than 2 minutes	Lo
2 minutes to 4 minutes	Me
4 minutes or more	Hi

The upper limit of the fan speed is the set speed.

If the thermostat turns off, this operation changes to flow soft control.

(4) Flow soft control

After the thermostat turns off, the indoor fan operates at VLo.

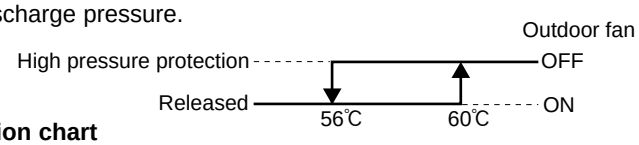
NOTE : When the thermostat turns on, the fan operates at the set speed. Due to the cold air prevention control, the fan does not start at set speed until the indoor coil thermistor RT12 reads 22°C or more.

2. High pressure protection

During heating operation, the outdoor fan motor is controlled by the temperature of indoor coil thermistor RT12 for excess rise protection of compressor discharge pressure.

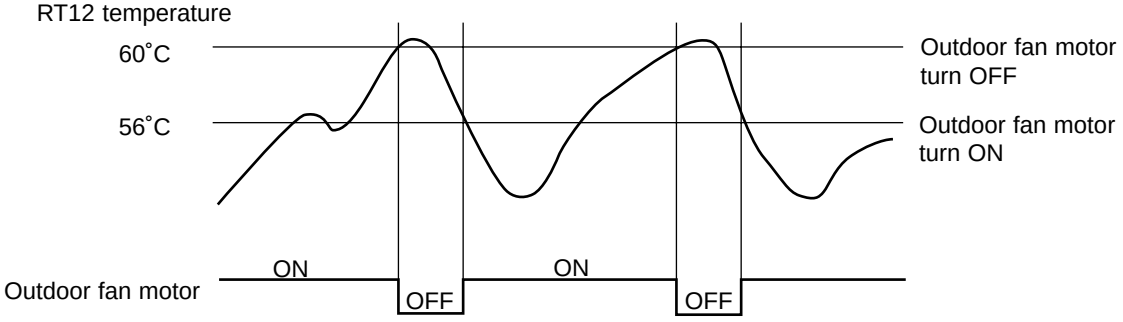
Outdoor fan OFF : 60°C

Outdoor fan ON : 56°C



High pressure protection chart

Example



NOTE 1 During high pressure protection and for 4 minutes and 15 seconds after high pressure protection, defrosting of outdoor heat exchanger is not detected by the defrost thermistor RT61.

NOTE 2 When connected to MXZ-32NV- E1 or MXZ-32NV- E2 or MXZ-32RV- E1 outdoor unit, the indoor unit send the data for the temperature to the outdoor unit according to the indoor coil temperature.

For the further information, refer to the service manual No.OB185 REVISED EDITION C(Outdoor unit: MXZ-32NV- E1 or MXZ-32NV- E2) or the service manual No.OB227 REVISED EDITION-B(Outdoor unit: MXZ-32RV- E1).

3. Defrosting

Defrosting of outdoor heat exchanger is controlled by DEICER P.C. board, with detection by the defrost thermistor RT61.

(1) Starting conditions of defrost

When all conditions of a) ~ c) are satisfied, the defrosting operation starts.

a) Under the heat operation, the compressor cumulative operation time exceeds 40 minutes without the defrosting operation working.

b) The defrost thermistor RT61 reads - 3°C or less.

c) After releasing the high pressure protection 4 minutes and 15 seconds have elapsed.

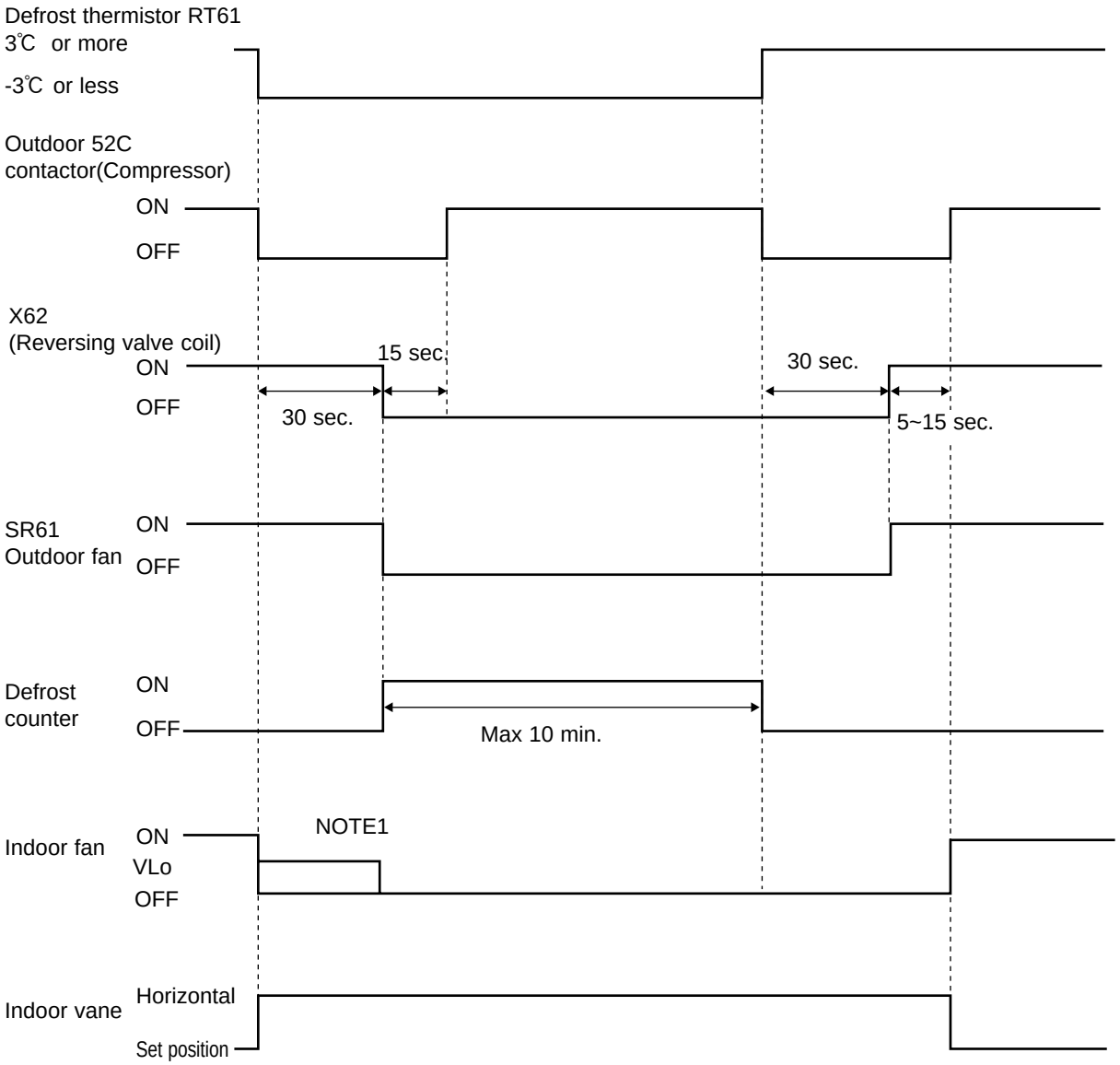
(2) Releasing conditions of defrost

When the condition d) or e) is satisfied, the defrosting operation stops.

d) The defrost thermistor RT61 reads 3°C or more.

e) The defrosting time exceeds 10 minutes.

(3) Defrosting time chart



NOTE1 • When the indoor coil thermistor reads above 18°C, indoor fan operates at VLo for 30 seconds.
• When the indoor coil thermistor reads 18°C or less, the indoor fan stops.

NOTE2 • Refer to the Service Manual OB185 REVISED EDITION C when MSH-18NV-E4 is connected with MXZ-32NV-E1 or MXZ-32NV- E2 as multi system units.
• Refer to the Service Manual OB227 REVISED EDITION-B when MSH-18NV-E4 is connected with MXZ-32RV-E1 as multi system units.

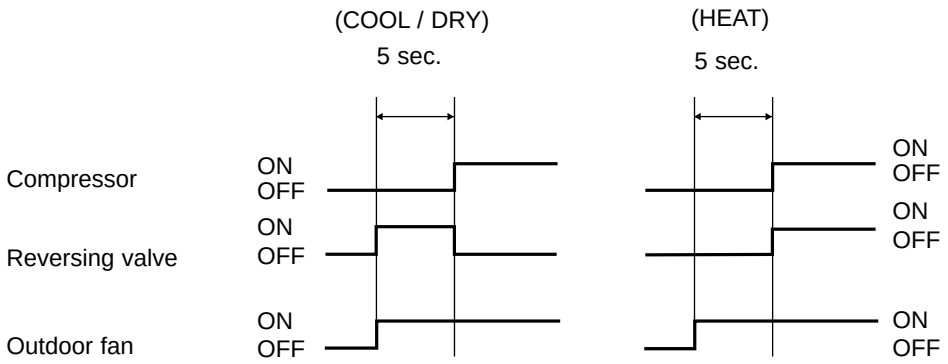
4. Reversing valve control

Heating · · · · · ON
Cooling · · · · · OFF
Dry · · · · · · · · OFF

NOTE1 The Reversing valve reverses for 5 seconds right before start-up of the compressor.

NOTE2 • Refer to the Service Manual OB185 REVISED EDITION C when MSH-18NV-E4 is connected with MXZ-32NV-E1 or MXZ-32NV- E2 as multi system units.

• Refer to the Service Manual OB227 REVISED EDITION-B when MSH-18NV-E4 is connected with MXZ-32RV-E1 as multi system units.

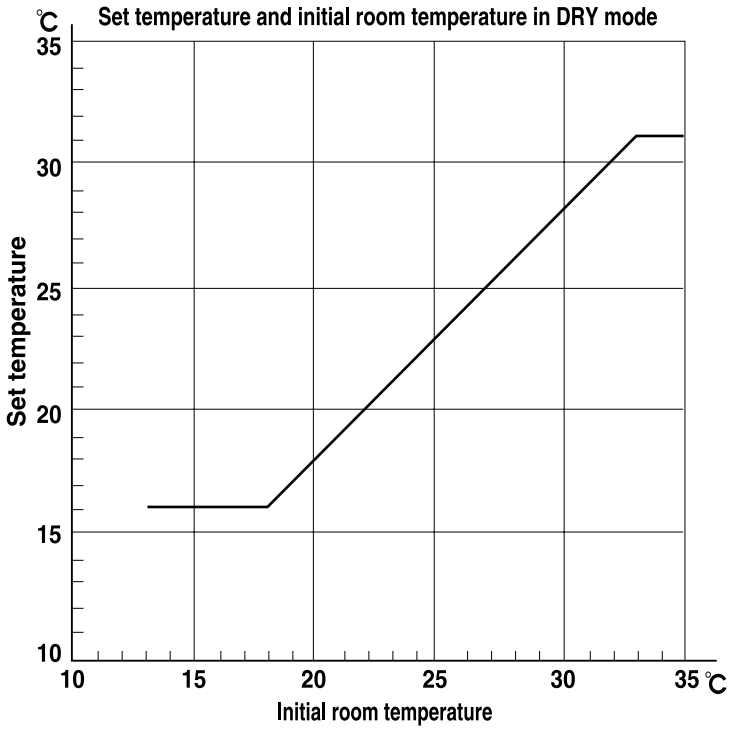


8-2. COOL (✿) OPERATION

(1) Press OPERATE/STOP (ON/OFF) button.
Operation Indicator lamp of the indoor unit turns on with a beep tone.
(2) Select COOL mode with the OPERATION SELECT button.
(3) Press the TEMPERATURES button. (TOO WARM or TOO COOL button) to select the desired temperature.
The setting range is 16 ~ 31°C.
✻ Indoor fan continues to operate regardless of thermostat's OFF-ON at set speed.
✻ Coil frost prevention is as same as COOL mode of "I FEEL CONTROL".

8-3. DRY (△) OPERATION

(1) Press OPERATE/STOP (ON/OFF) button.
Operation Indicator lamp of the indoor unit turns on with a beep tone.
(2) Select DRY mode with the OPERATION SELECT button.
(3) The microprocessor reads the room temperature and determines the set temperature. Set temperature is as shown on the right chart.
Thermostat (SET TEMP.)does not work.
The other operations are same as DRY mode of "I FEEL CONTROL".
(4) DRY operation will not function when the room temperature is 13°C or below.
(5) When DRY operation functions, the fan speed is lower than cool operation.



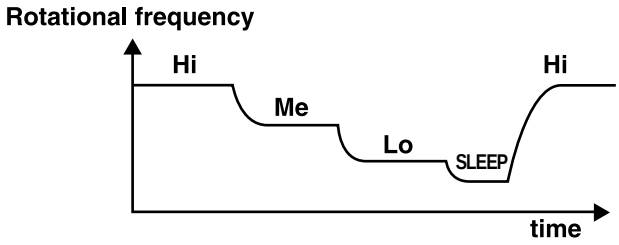
8-4. HEAT (☼) OPERATION

(1) Press OPERATE/STOP (ON/OFF) button.
Operation Indicator lamp of the indoor unit turns on with a beep tone.
(2) Select HEAT mode with the OPERATION SELECT button.
(3) Press TEMPERATURES button (TOO WARM or TOO COOL button) to select the desired temperature.
The setting range is 16 ~ 31°C.
(4) Indoor fan speed control, high pressure protection, defrosting, reversing valve control are the same as HEAT mode of "I

8-5. FAN MOTOR CONTROL

(1) Rotational frequency feedback control

The indoor fan motor is equipped with a rotational frequency sensor, and outputs signal to the microprocessor to feed back the rotational frequency. Comparing the current rotational frequency with the target rotational frequency (Hi,Me,Lo,SLEEP), the microprocessor controls IC141 and adjusts fan motor electric current to make the current rotational frequency close to the target rotational frequency. With this control, when the fan speed is switched, the rotational frequency changes smoothly.



(2) Fan motor lock-up protection

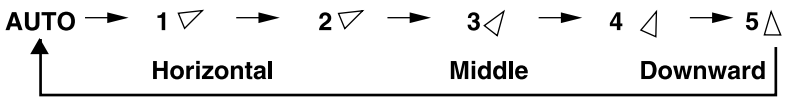
When the rotational frequency feedback signal has not output for 12 seconds, (or when the microprocessor cannot detect the signal for 12 seconds) the fan motor is regarded locked-up. Then the electric current to the fan motor is shut off. 3 minutes later, the electric current is applied to the fan motor again. During the fan motor lock-up, the Operation Indicator lamp flashes on and off to show the fan motor abnormality. (See page 23.)

8-6. AUTO VANE OPERATION

(1) Vane motor drive

This model is equipped with a stepping motor for the horizontal vane. The rotating direction, speed, and angle of the motor are controlled by pulse signals (approx. 12V) transmitted from indoor microprocessor.

(2) The horizontal vane angle and mode changes as follows by pressing the VANE CONTROL ( ) button.



(3) Positioning

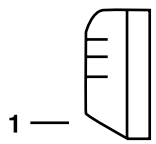
The vane is once pressed to the vane stopper below to confirm the standard position and then set to the desired angle. Confirming of standard position is performed in case of follows.

(a) When the OPERATE/STOP (ON/OFF) button is pressed.
(b) When the vane control is changed from AUTO to MANUAL.
(c) When the SWING is finished.
(d) When the test run starts.
(e) When the power supply turns ON.

(4) VANE AUTO ( ) mode

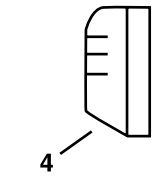
In VANE AUTO mode, the microprocessor automatically determines the vane angle and operation to make the optimum room-temperature distribution.

① In COOL and DRY operation



Vane angle is fixed to Angle 1.

② In HEAT operation



Vane angle is fixed to Angle 4.

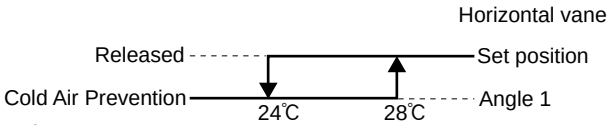
(5) Dew prevention
During COOL or DRY operation at vane Angle 4 or 5 when the compressor cumulative operation time exceeds 1 hour, the vane angle automatically changes to Angle 1 for dew prevention.

(6) SWING MODE ( )

By pressing the SWING button ( ) the horizontal vane swings vertically. The remote controller displays " ". SWING mode is cancelled when the SWING button or VANE CONTROL button ( ) is pressed or the mode is changed to other mode.

(7) Cold air prevention in HEAT operation
When any of the following conditions occurs in HEAT operation, the horizontal vane angle changes to Angle 1 automatically to prevent cold air blowing on users.
① Compressor is not operating.
② Defrosting is performed.
③ Indoor coil thermistor RT12 reads 24℃ or below.
④ Indoor coil thermistor RT12 temperature is raising from 24°C or below, but it does not exceed 28℃.

Indoor coil thermistor RT12 temperature



NOTE:At initial in hysteresis this control works.

8-7. SLEEP MODE ( )

- When the SLEEP button ( ) is pressed, the indoor fan speed drops and the air flow sound from the indoor unit is decreased.
- The indications of the remote controller are " " and " ".
- When the FAN SPEED CONTROL button ( ) or the SLEEP button ( ) or mode change button is pressed during the SLEEP mode, the SLEEP mode is released.

8-8. TIMER OPERATION

1. How to set the timer

(1) Press OPERATE/STOP (ON/OFF) button to start the air conditioner.
(2) Check that the current time is set correctly.
NOTE : Timer operation will not work without setting the current time. Initially "AM0:00" blinks at the current time display of TIME MONITOR, so set the current time correctly with CLOCK SET button.
(3) Press TIMER CONTROL button to select the operation.
" →| " button... AUTO START operation (ON timer)
" →○ " button... AUTO STOP operation (OFF timer)
(4) Press HR. and MIN. button to set the timer. Time setting is 10-minute units.
HR. and MIN. button will work when " →| " or " →○ " mark is flashing.
These marks disappear in 1 minute.
After setting the ON timer, check that OPERATION INDICATOR lamp of the indoor unit lights.
NOTE1 : Be sure to place the remote controller at the position where its signal can reach the air conditioner even during TIMER operation, or the set time may deviate within the range of about 10 minutes.

NOTE2 : Reset the timer in the following cases, or the set time may deviate and other malfunctions may occur.
• A power failure occurs.
•The circuit breaker functions.

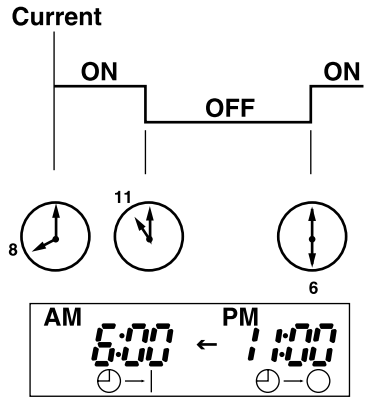
2. Cancel

TIME setting can be cancelled with the TIMER CONTROL buttons. (" →| " or " →○ ")
To cancel the ON timer, press the " →| " button.
To cancel the OFF timer, press the " →○ " button.
TIME is cancelled and the display of set time disappears.

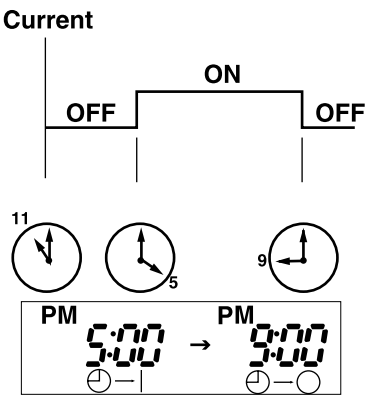
PROGRAM TIMER

• The OFF timer and ON timer can be used in combination.
• " → " and " ← " display shows the order of the OFF timer and ON timer operation.

(Example 1) The current time is 8:00 PM.
The unit turns off at 11:00 PM, and on at 6:00 AM.



(Example 2) The current time is 11:00 AM.
The unit turns on at 5:00 PM, and off at 9:00 PM.

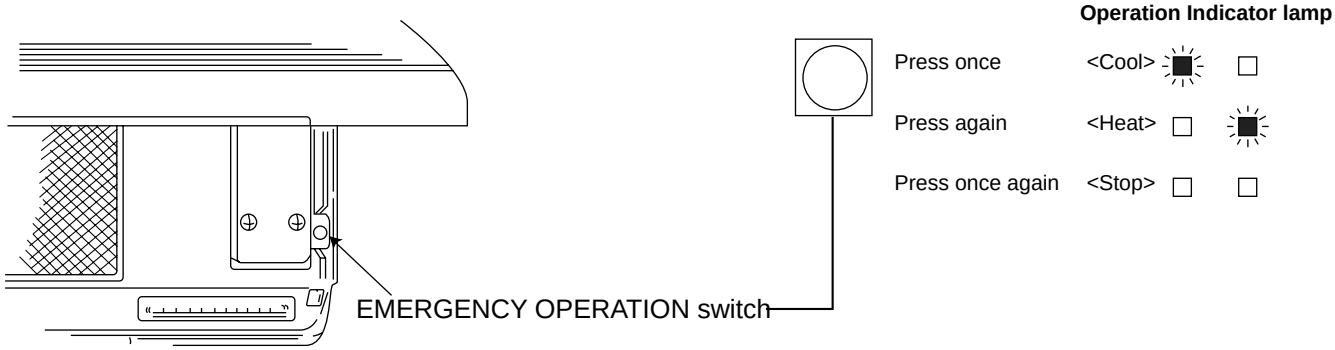


NOTE : TIMER setting will be cancelled by power failure or breaker functioning.

8-9. EMERGENCY-TEST OPERATION

When the remote controller is missing, has failed or the batteries run down, press the EMERGENCY OPERATION switch on the front of the indoor unit. The unit will start and the Operation Indicator lamp will light.
The first 30 minutes of operation is the test run operation. This operation is for servicing. The indoor fan runs at high notch and the system is in continuous operation. (The thermostat is ON.)
After 30 minutes of test run operation the system shifts to EMERGENCY COOL/HEAT MODE with a set temperature of 24°C. The fan shifts to Me notch.
This operation continues until the EMERGENCY OPERATION switch is pressed again or the unit receives any signal from the remote controller. In case of latter normal operation will start.
The coil frost prevention works even in this operation, and defrosting too.
In the test run or emergency operation, the horizontal vane operates in VANE AUTO mode.

NOTE : Do not press the EMERGENCY OPERATION switch during normal operation.



9 SERVICE FUNCTIONS

MSH-18NV -E4

9-1. COMPULSORY DEFROSTING MODE FOR SERVICE

By short circuit of the connector JP607 and R853 on the outdoor deicer P.C. board, defrosting mode can be accomplished regardless of the defrost interval restriction. See page 29.
Defrost thermistor RT61 must read below -3°C.

9-2. CHANGE IN DEFROST SETTING

<JPC> when the JPC wire of the deicer P.C. board is cut, the defrost interval time will be changed. (See page 29.)
<JPE> when the JPE wire of the deicer P.C. board is cut, the defrost temperature will be changed. (See page 29.)

Jumper wire	Change point
JPC	Defrost interval time changes from 40 minutes to 15 minutes
JPE	Deforst start temperature changes from -3℃ to 0℃ Deforst finish temperature changes from 3℃ to 10℃.

9-3. TIMER SHORT MODE

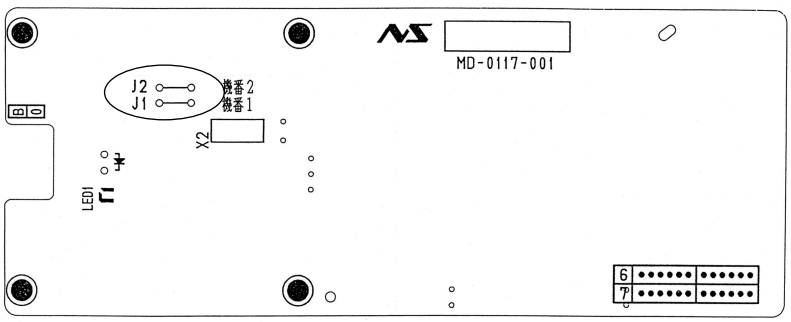
For service, set time can be shortened by short circuit of JPG and JPS the electronic control P.C. board.
The time will be shortened as follows.
3-minutes delay : 3-minutes ➔ 3-seconds.
AUTO START : 1 hour ➔ 1-minute
AUTO STOP : 1 hour ➔ 1-minute
} Short the connector during the timer mode.

9-4. P.C. BOARD MODIFICATION FOR INDIVIDUAL OPERATION

A maximum of 4 indoor units with wireless remote controllers can be used in a room.
In this case, to operate each indoor unit individually by each remote controller, P.C. boards of remote controller must be modified according to the number of the indoor unit.

How to modify the remote controller P.C. board

Remove batteries before modification.
The board has a print as shown below :



NOTE : For remodelling, take out the batteries at first. After finish remodelling, put back the batteries then push the RESET button.

The P.C.board has the print “J1” and “J2”.Jumper wires are mounted to each “J1” and “J2”.Cut J1 and J2 according to the number of indoor unit as shown in Table. 1.
After modification, push the reset button.

Table.1

	1 unit operation	2 units operation	3 units operation	4 units operation
No. 1 unit	No modification	Same as at left	Same as at left	Same as at left
No. 2 unit	–	Cut J1	Same as at left	Same as at left
No. 3 unit	–	–	Cut J2	Same as at left
No. 4 unit	–	–	–	Cut both J1 and J2

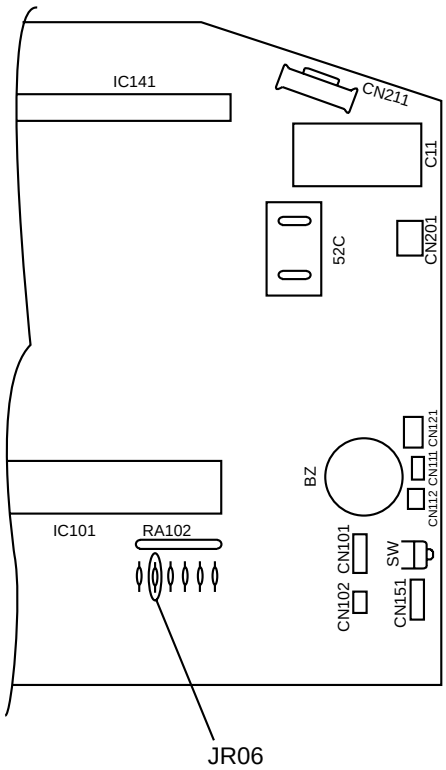
NOTE : At power supply failure or installation, indoor unit deletes the memory about remote controller. When the power supply is turned on and indoor unit receives the first signals from the remote controller, the remote controller number is designated as the indoor unit number. Therefore at and after the second time indoor unit accepts the remote controller of the initial setting number.
At setting - error, turn the power supply off to cancel the individual operation and then turn the power supply on to restart the setting.

9-5. AUTO RESTART FUNCTION

When the indoor unit is controlled with the remote controller, the operation mode, set temperature, and the fan speed are memorized by the indoor electronic control P.C.board. The “AUTO RESTART FUNCTION” sets to work the moment power has restored after power failure.Then, the unit will restart automatically. However if the unit is operated in “I FEEL CONTROL” mode before power failure, the operation is not memorized. In “I FEEL CONTROL” mode, the operation is decided by the initial room temperature.

How to set “AUTO RESTART FUNCTION”

①Turn off the main power for the unit.
②Remove the electronic control P.C. board and the display P.C.board. (See page 30.)
③Cut the RESISTOR JR06 on the indoor electronic control P.C.board.



Operation

①If the main power (220/240V AC) has been cut, the operation settings remain.
②After the power is restored, the unit restarts automatically according to the memory.(However, it takes at least 3 minutes for the compressor to start running.)

NOTE

- The operation settings are memorized when 10 seconds have passed after the remote controller was operated.
- If main power is turned off or a power failure occurs while AUTO START/STOP timer is active ,the timer setting is cancelled.
- If the unit has been off with the remote controller before power failure, the auto restart function does not work as the power button of the remote controller is off.
- To prevent breaker off due to the rush of starting current, systematize other home appliances not to turn on at the same time.
- When some air conditioners are connected to the same supply system, if they are operated before power failure, the starting current of all the compressors may flow simultaneously at restart.
  Therefore, the special counter-measures are required to prevent the main voltage-drop or the rush of the starting current by adding to the system that allows the units to start one by one.

10 TROUBLESHOOTING

MSH-18NV -E4

10-1. Cautions on troubleshooting

1. Before troubleshooting, check the following:

(1) Check the power supply voltage.

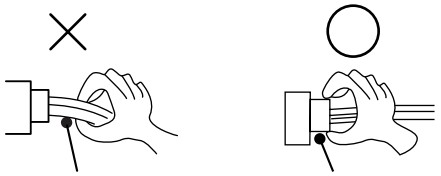
(2) Check the indoor/outdoor connecting wire for mis-wiring.

2. Take care the following during servicing.

(1) Before servicing the air conditioner, be sure to first turn off the remote controller to stop the main unit, and then after confirming the horizontal vane is closed, turn off the breaker and / or disconnect the power plug.

(2) When removing the electronic control P.C. board, hold the edge of the board with care NOT to apply stress on the components.

(3) When connecting or disconnecting the connectors, hold the housing of the connector. DO NOT pull the lead wires.



3. Troubleshooting procedure

(1) First, check if the Operation Indicator lamp on the indoor unit is flashing on and off to indicate an abnormality. To make sure, check how many times the abnormality indication is flashing on and off before starting service work.

(2) If the electronic control P.C. board is supposed to be defective, check the copper foil pattern for disconnection and the components for bursting and discolouration.

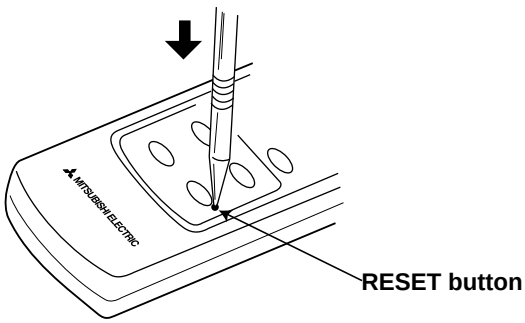
(3) When troubleshooting, refer to the flow chart on page 22 and the check table on page 23.

4. How to replace batteries

Weak batteries may cause the remote controller malfunction.

In this case, the remote controller can not be repaired only by the battery replacement. To operate the remote controller normally, discharge the remote controller in the following order.

This remote controller has the RESET button. After refilling new batteries, press the RESET button with tip end of ball point pen or the like, and then use the remote controller.



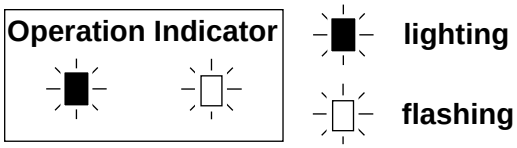
NOTE: INFORMATION FOR MULTI SYSTEM AIR CONDITIONER

(OUTDOOR UNIT : MXZ-32NV-E1, MXZ-32NV-E2, MXZ-32RV-E1)

Multi system air conditioner (Outdoor unit: MXZ-32NV-E1, MXZ-32NV-E2, MXZ-32RV-E1) can connect two or more indoor units with one outdoor unit.

According to the capacity, two or more units can operate simultaneously.

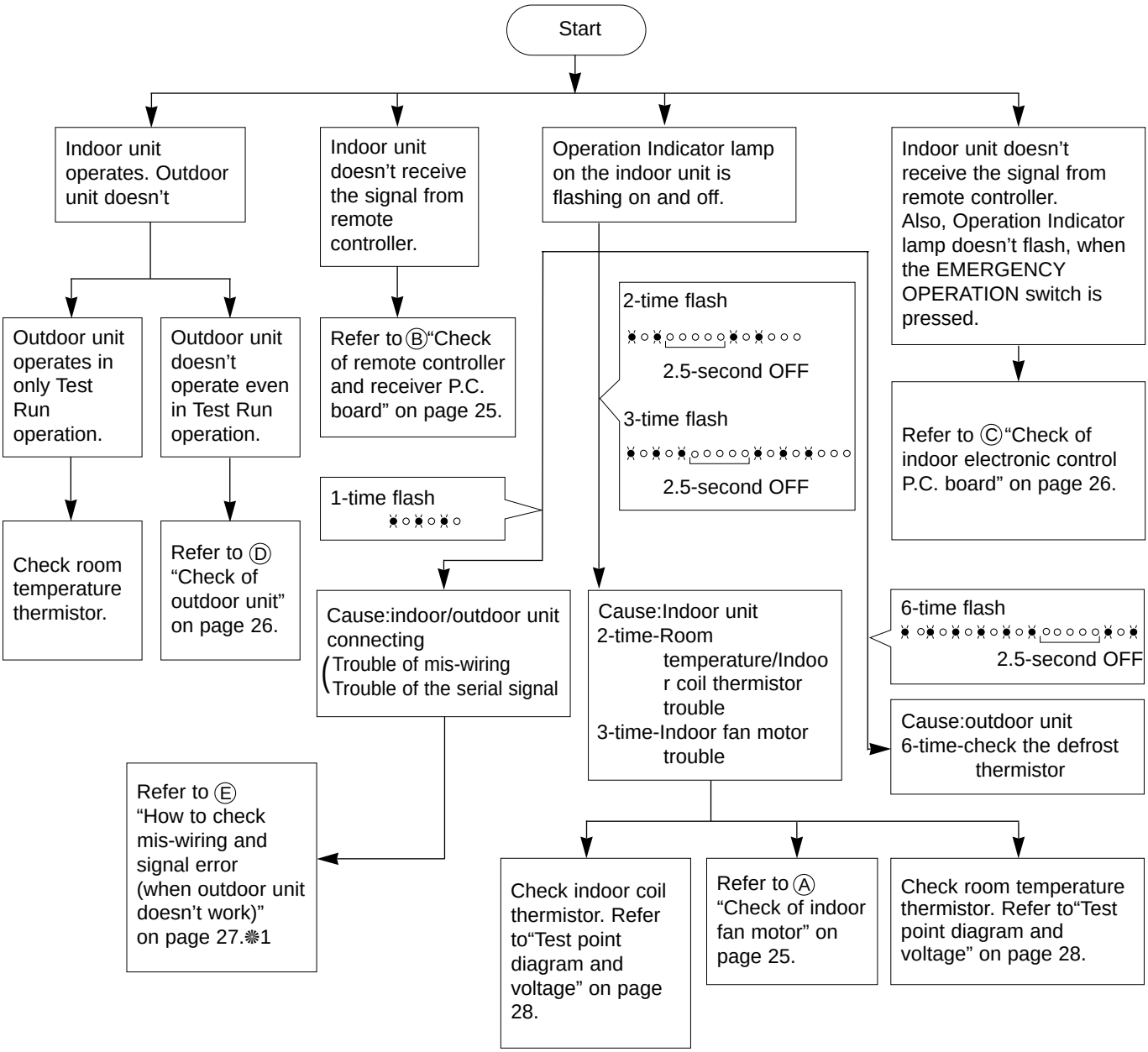
•When you try to operate two or more indoor units with one outdoor unit simultaneously, one for the cooling and the other for heating, the operation mode of the indoor unit that operates earlier is selected. The other indoor units that will start the operation later cannot operate, indicating as shown in the figure below. In this case, please set all the indoor units to the same operation mode.



•When indoor units starts the operation while the defrosting of outdoor unit is being done, it takes a few minutes (max. 10 minutes) to blow out the warm air.

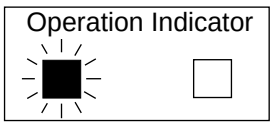
•In the heating operation, though indoor unit that does not operate may get warm or the sound of refrigerant flowing may be heard, they are not malfunction. The reason is that the refrigerant continuously flows into it.

10-2. Instruction of troubleshooting


Start
Indoor unit operates. Outdoor unit doesn't
Indoor unit doesn't receive the signal from remote controller.
Operation Indicator lamp on the indoor unit is flashing on and off.
Indoor unit doesn't receive the signal from remote controller.
Also, Operation Indicator lamp doesn't flash, when the EMERGENCY OPERATION switch is pressed.
Outdoor unit operates in only Test Run operation.
Outdoor unit doesn't operate even in Test Run operation.
Refer to Ⓑ"Check of remote controller and receiver P.C. board" on page 25.
2-time flash
2.5-second OFF
3-time flash
2.5-second OFF
Refer to Ⓒ"Check of indoor electronic control P.C. board" on page 26.
1-time flash
Check room temperature thermistor.
Refer to Ⓓ "Check of outdoor unit" on page 26.
Cause:indoor/outdoor unit connecting
Trouble of mis-wiring
Trouble of the serial signal
Cause:Indoor unit
2-time-Room temperature/Indoor coil thermistor trouble
3-time-Indoor fan motor trouble
6-time flash
2.5-second OFF
Cause:outdoor unit
6-time-check the defrost thermistor
Refer to Ⓔ "How to check mis-wiring and signal error (when outdoor unit doesn't work)" on page 27.✵1
Check indoor coil thermistor. Refer to"Test point diagram and voltage" on page 28.
Refer to Ⓐ "Check of indoor fan motor" on page 25.
Check room temperature thermistor. Refer to"Test point diagram and voltage" on page 28.

✵1<The case of the trouble of the serial signal>
When the power is turned off and then turned on again, the indication shows "the trouble of mis-wiring."

1. troubleshooting check table



❋ Before taking measures, make sure that the symptom reappears, for accurate troubleshooting.

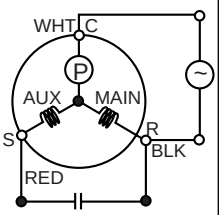
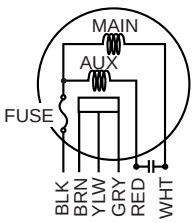
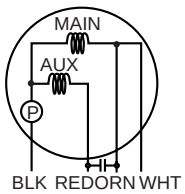
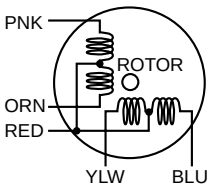
Self check table

NO.	Abnormal point	Indication	Symptom	Detect method	Check point
1	Mis-wiring	0.5-second ON 0.5-second OFF	Outdoor unit does not run.	When serial signal stops for 4 to 5 seconds after 1st on of 52C relay by POWER turning on.	● Check wiring (visual check and conductivity check). ● Check indoor electronic control P.C.board. ● Check outdoor DEICER P.C. board. ● Check electrical parts.
	Serial signal	1-time flash 2.5-second OFF		When serial signal from outdoor unit stops for 4 to 5 seconds.	
2	Indoor coil thermistor Room temperature thermistor	2-time flash 2.5-second OFF	Outdoor unit does not run.	Detect Indoor coil/room temperature thermistor short or open circuit every 8 seconds during operation.	● Check resistance of thermistor. ● Reconnect connector. ● Check indoor electronic control P.C.board.
3	Indoor fan motor	3-time flash 2.5-second OFF	Indoor fan motor repeats 12 seconds ON and 3 minutes OFF. When the indoor fan breaks, the fan motor keeps stopping.	When rotational frequency feedback signal is not emit during 12-second indoor fan operation.	● Disconnect connector CN211 and then check connector CN121②-③to make sure rotational frequency feedback signal of 1.5V or over exists. ● Check indoor electronic control P.C. board. ● Check indoor fan motor. ● Reconnect connector.
4	Defrost thermistor	6-time flash 2.5-second OFF	Outdoor unit does not run	When the defrost thermistor shorts or opens after the compressor start-up.	● Check outdoor DEICER P.C. board. ● Check resistance of thermistor. ● Reconnect connector.
❋ 5	Outdoor power system	5-time flash 2.5-second OFF	Outdoor unit does not run	When the compressor operation is continuously three times interrupted by over current protection within 1 minute after start-up , it stops operation.	● Check the inverter output. ● Check the compressor.
❋ 6	Outdoor control P.C. board	7-time flash 2.5-second OFF	Outdoor unit does not run	The outdoor unit stops operation when it cannot properly read data in the nonvolatile memory of the outdoor control P.C.board.	● Check the outdoor control P.C.board.
❋ 7	Outdoor control P.C. board	10-time flash 2.5-second OFF	Outdoor unit does not run	When the indoor unit detects drain abnormality and the indoor coil temperature is too low.	● Check the drain pump. ● Check the drain sensor. ● Check LEV.
❋ 8	Outdoor control P.C. board	Operation Indicator □ lighting ☼ flashing 2.5-second OFF	Outdoor unit runs but the indoor unit does not run.	When the operation mode of each rooms is set COOL(includes DRY) and HEAT at same time, it take precedence the operation mode runs first.	● Adjust the operation mode.

❋The indication is shown only when the indoor unit connects with the outdoor unit MXZ-32NV-E1 or MXZ-32NV-E2 or MXZ-32RV-E1.

2. Trouble criterion of main parts

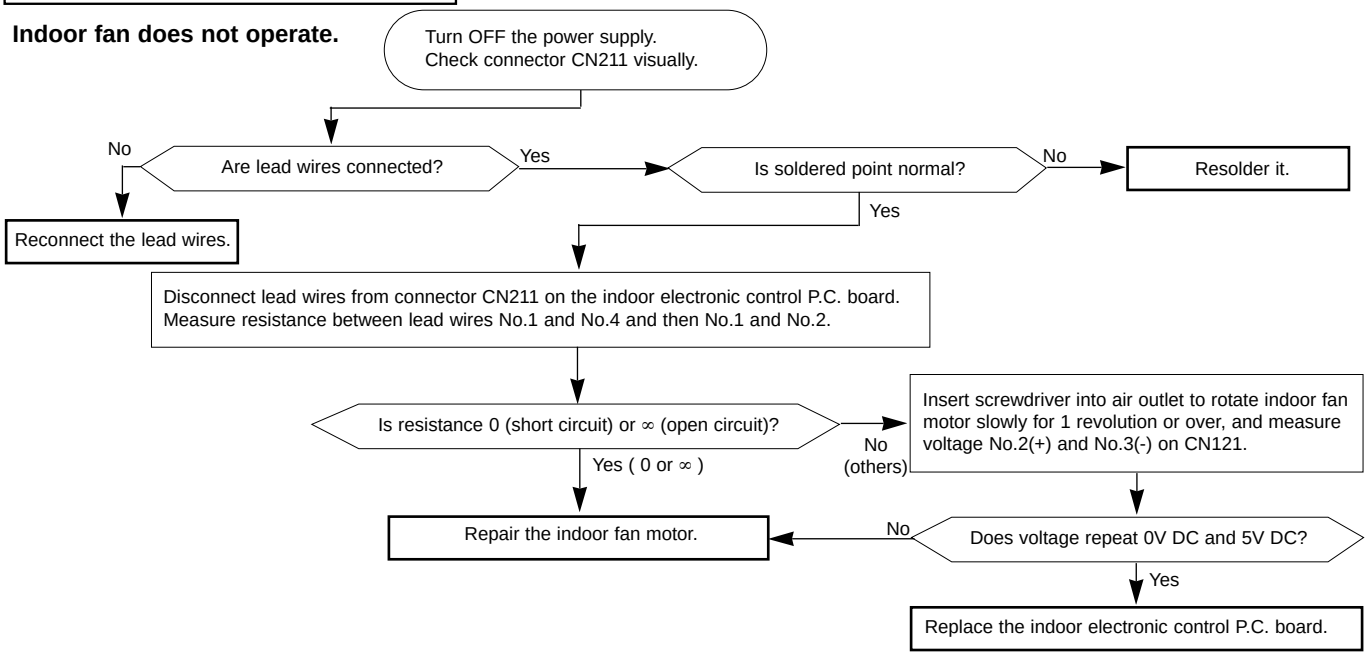
MSH-18NV -E4

<table>
<tr><th>Part name</th><th colspan="2">Check method and criterion</th><th>Figure</th></tr>
<tr><td>Room temperature thermistor
Indoor coil thermistor</td><td colspan="2">Measure the resistance with a tester.
(Part temperature 10°C ~ 30°C)<table><tr><th>Normal</th><th>Abnormal</th></tr><tr><td>8kΩ ~ 20kΩ</td><td>Opened or short-circuited</td></tr></table></td><td></td></tr>
<tr><td>Defrost thermistor</td><td colspan="2">Measure the resistance with a tester.
(Part temperature –10°C ~ 40°C)<table><tr><th>Normal</th><th>Abnormal</th></tr><tr><td>5kΩ ~ 60kΩ</td><td>Opened or short-circuited</td></tr></table></td><td></td></tr>
<tr><td>Compressor</td><td colspan="2">Measure the resistance between the terminals with a tester.
(Coil wiring temperature –10°C ~ 40°C)<table><tr><th></th><th>Normal</th><th>Abnormal</th></tr><tr><td>C-R</td><td>0.90Ω ~ 1.11Ω</td><td rowspan="2">Opened or short-circuited</td></tr><tr><td>C-S</td><td>1.79Ω ~ 2.20Ω</td></tr></table></td><td> 
</td></tr>
<tr><td rowspan="2">Indoor fan motor</td><td>Motor part</td><td>Measure the resistance between the terminals with a tester.
(Coil wiring temperature10°C ~ 30°C)<table><tr><th></th><th>Normal</th><th>Abnormal</th></tr><tr><td>WHT-BLK</td><td>176 ~ 192Ω</td><td rowspan="2">Opened or short-circuited</td></tr><tr><td>BLK-RED</td><td>240 ~ 261Ω</td></tr></table></td><td rowspan="2"> 
</td></tr>
<tr><td>Sensor part</td><td>Measure the voltage Power ON.<table><tr><th></th><th>Normal</th><th>Abnormal</th></tr><tr><td>BRN-YLW</td><td>4.5 ~ 5.5V</td><td rowspan="2">Remain 0V or 5V</td></tr><tr><td>YLW-GRY</td><td>(When fan revolved one time)
0V→5V→0V
(Approx.)</td></tr></table></td></tr>
<tr><td>Outdoor fan motor</td><td colspan="2">Measure the resistance between the terminals with a tester.
(Coil wiring temperature –10°C ~ 40°C)<table><tr><th></th><th>Normal</th><th>Abnormal</th></tr><tr><td>WHT-BLK</td><td>102 ~ 126Ω</td><td rowspan="2">Opened or short-circuited</td></tr><tr><td>BLK-RED</td><td>97.9 ~ 120Ω</td></tr></table></td><td> 
</td></tr>
<tr><td>Vane motor</td><td colspan="2">Measure the resistance between the terminals with a tester.
(Part temperature10°C ~ 30°C)<table><tr><th>Normal</th><th>Abnormal</th></tr><tr><td>358 ~ 388Ω</td><td>Opened or short-circuited</td></tr></table></td><td> 
</td></tr>
</table>

Ⓟ INNER PROTECTOR

Ⓐ Check of indoor fan motor

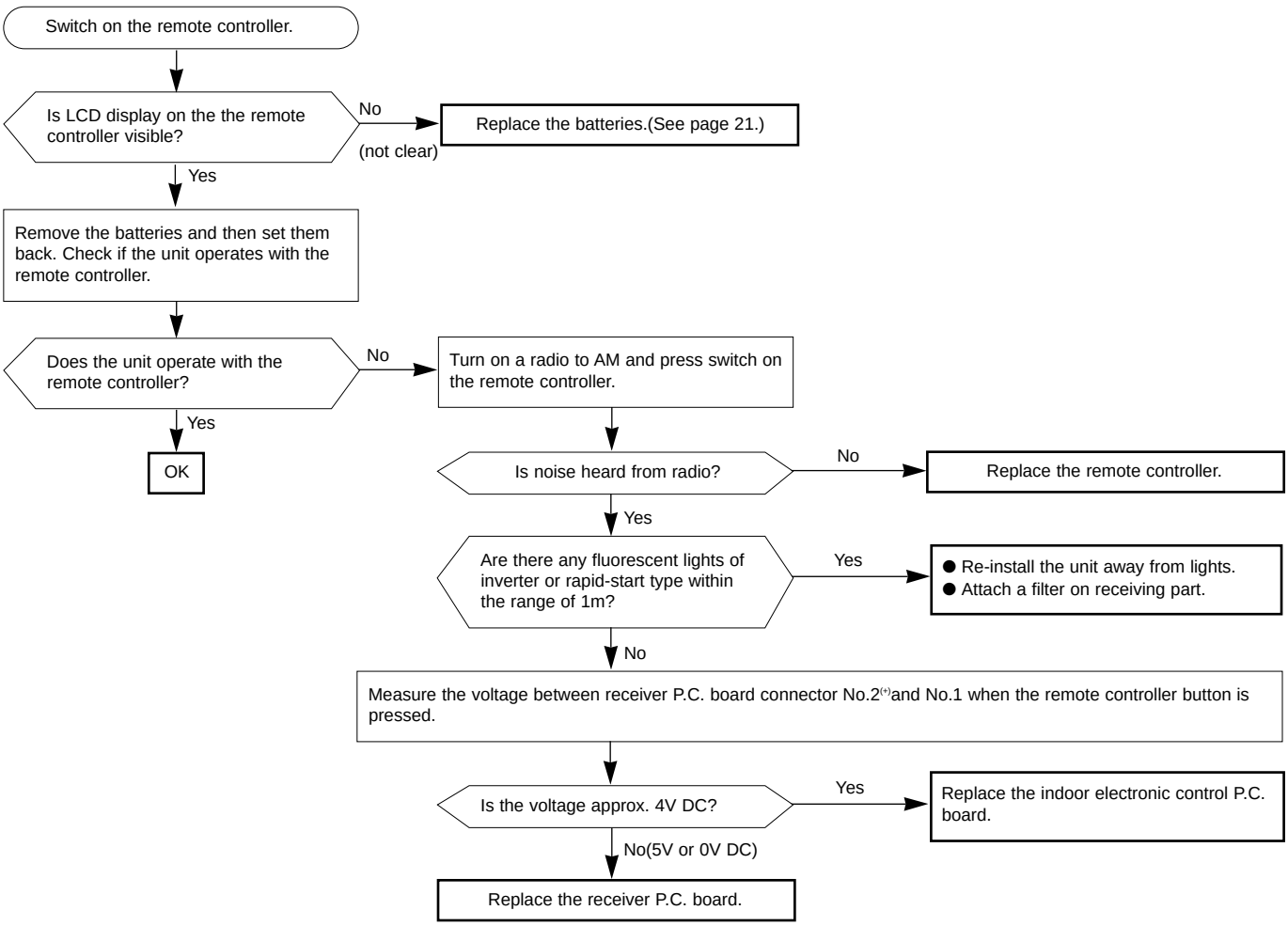
Indoor fan does not operate.


Turn OFF the power supply.
Check connector CN211 visually.
Are lead wires connected?
No
Yes
Is soldered point normal?
No
Resolder it.
Yes
Reconnect the lead wires.
Disconnect lead wires from connector CN211 on the indoor electronic control P.C. board.
Measure resistance between lead wires No.1 and No.4 and then No.1 and No.2.
Is resistance 0 (short circuit) or ∞ (open circuit)?
No (others)
Insert screwdriver into air outlet to rotate indoor fan motor slowly for 1 revolution or over, and measure voltage No.2(+) and No.3(-) on CN121.
Yes (0 or ∞)
Repair the indoor fan motor.
No
Does voltage repeat 0V DC and 5V DC?
Yes
Replace the indoor electronic control P.C. board.

Ⓑ Check of remote controller and receiver P.C. board

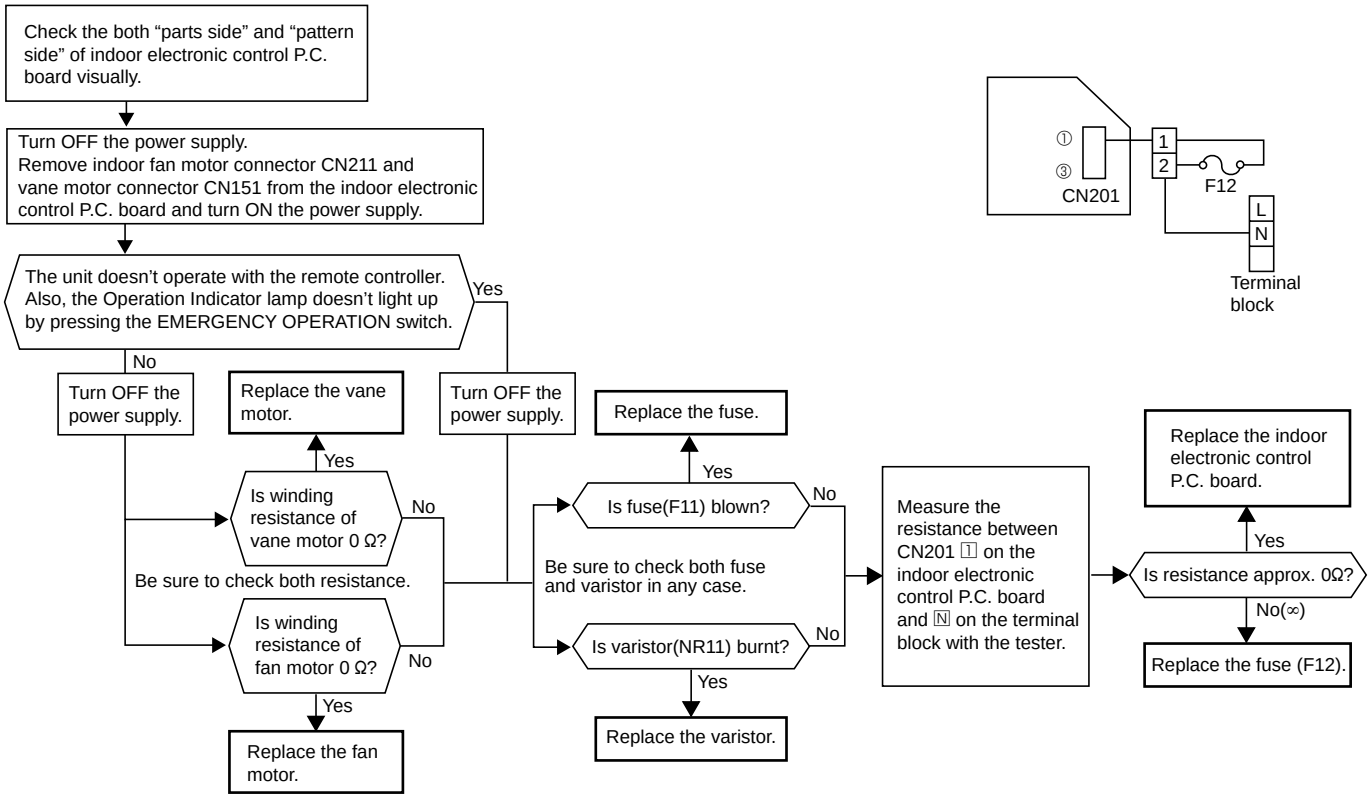
Indoor unit operates by pressing the EMERGENCY OPERATION switch, but does not operate with the remote controller.

※ Check if the remote controller is exclusive for this air conditioner.


Switch on the remote controller.
Is LCD display on the the remote controller visible?
No
(not clear)
Replace the batteries.(See page 21.)
Yes
Remove the batteries and then set them back. Check if the unit operates with the remote controller.
Does the unit operate with the remote controller?
No
Turn on a radio to AM and press switch on the remote controller.
Yes
OK
Is noise heard from radio?
No
Replace the remote controller.
Yes
Are there any fluorescent lights of inverter or rapid-start type within the range of 1m?
Yes
● Re-install the unit away from lights.
● Attach a filter on receiving part.
No
Measure the voltage between receiver P.C. board connector No.2(+)and No.1 when the remote controller button is pressed.
Is the voltage approx. 4V DC?
Yes
Replace the indoor electronic control P.C. board.
No(5V or 0V DC)
Replace the receiver P.C. board.

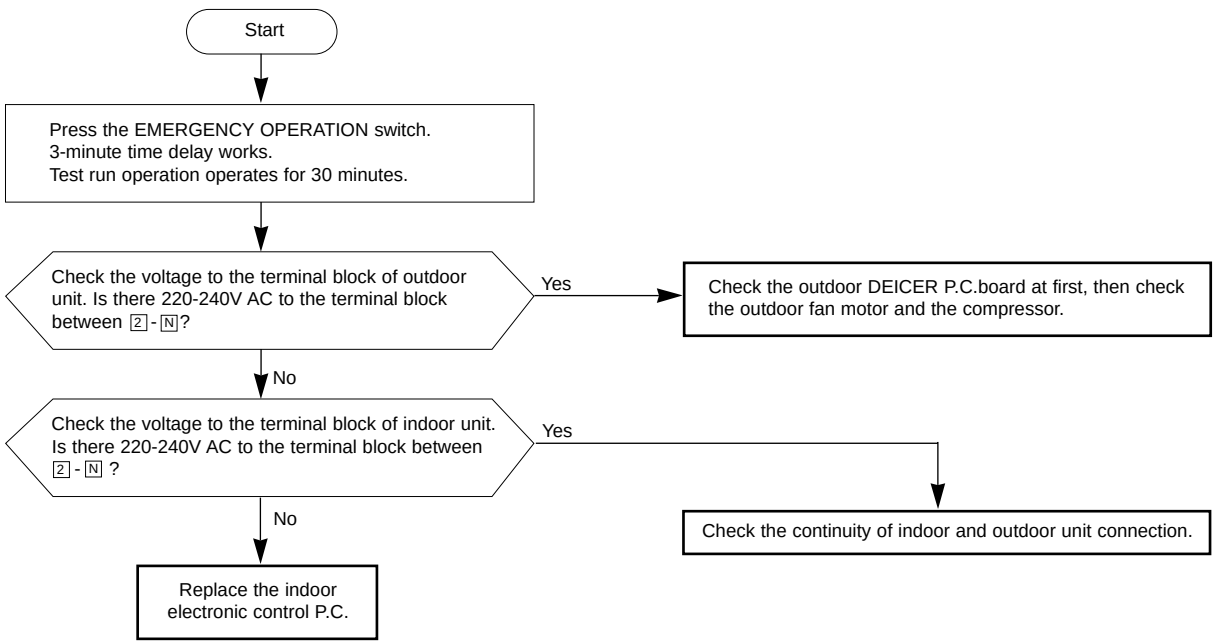
ⓒCheck of indoor electronic control P.C. board

The unit doesn't operate with the remote controller. Also, the OPERATION INDICATOR lamp doesn't light up by pressing the EMERGENCY OPERATION switch.

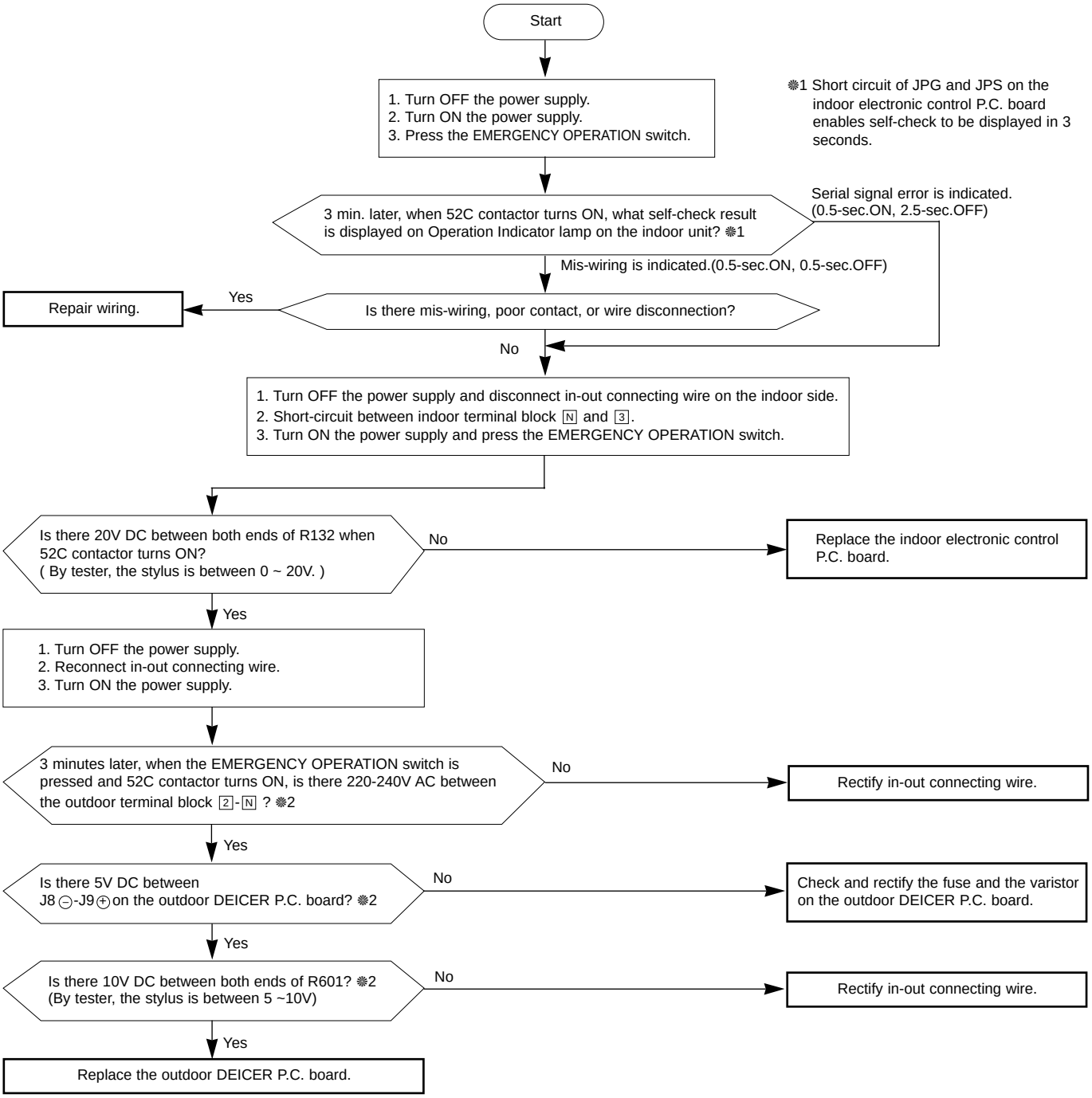

Check the both "parts side" and "pattern side" of indoor electronic control P.C. board visually.
Turn OFF the power supply.
Remove indoor fan motor connector CN211 and vane motor connector CN151 from the indoor electronic control P.C. board and turn ON the power supply.
The unit doesn't operate with the remote controller. Also, the Operation Indicator lamp doesn't light up by pressing the EMERGENCY OPERATION switch.
Yes
No
Turn OFF the power supply.
Replace the vane motor.
Turn OFF the power supply.
Yes
Is winding resistance of vane motor 0 Ω?
No
Be sure to check both resistance.
Is winding resistance of fan motor 0 Ω?
No
Yes
Replace the fan motor.
Replace the fuse.
Yes
Is fuse(F11) blown?
No
Be sure to check both fuse and varistor in any case.
Is varistor(NR11) burnt?
No
Yes
Replace the varistor.
Measure the resistance between CN201 1 on the indoor electronic control P.C. board and N on the terminal block with the tester.
Replace the indoor electronic control P.C. board.
Yes
Is resistance approx. 0Ω?
No(∞)
Replace the fuse (F12).
① ③ CN201
1 2 F12
L N
Terminal block

ⓓCheck of outdoor unit

Compressor and outdoor fan do not operate.(Only indoor fan operates.)

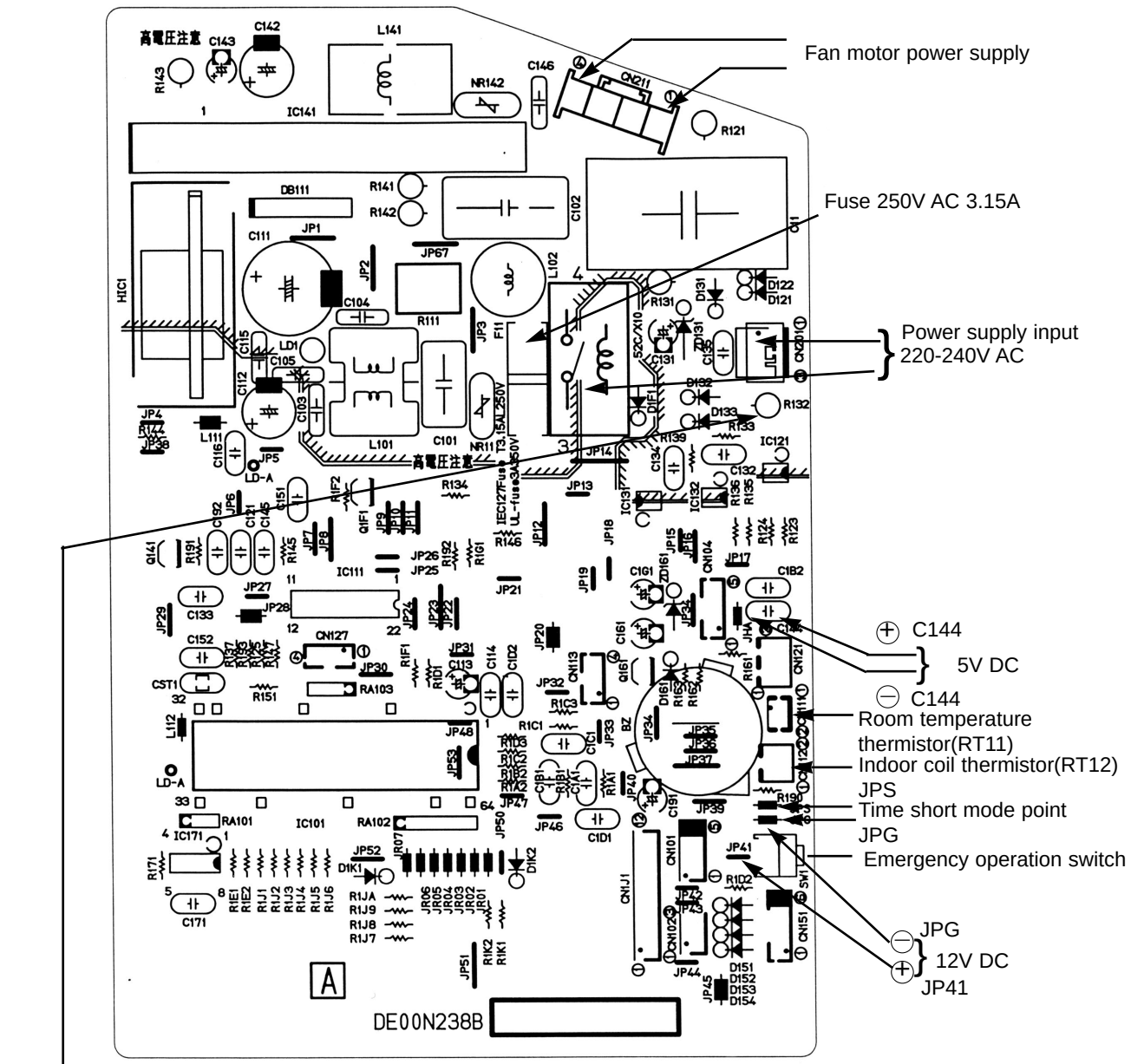

Start
Press the EMERGENCY OPERATION switch.
3-minute time delay works.
Test run operation operates for 30 minutes.
Check the voltage to the terminal block of outdoor unit. Is there 220-240V AC to the terminal block between 2 - N?
Yes
Check the outdoor DEICER P.C.board at first, then check the outdoor fan motor and the compressor.
No
Check the voltage to the terminal block of indoor unit. Is there 220-240V AC to the terminal block between 2 - N ?
Yes
Check the continuity of indoor and outdoor unit connection.
No
Replace the indoor electronic control P.C.

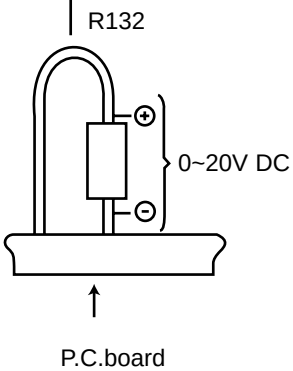
Ⓔ How to check mis-wiring and serial signal error (when outdoor unit does not work)

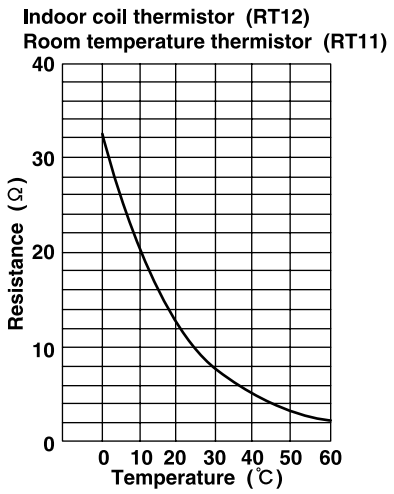

Start
1. Turn OFF the power supply.
2. Turn ON the power supply.
3. Press the EMERGENCY OPERATION switch.
❋1 Short circuit of JPG and JPS on the indoor electronic control P.C. board enables self-check to be displayed in 3 seconds.
3 min. later, when 52C contactor turns ON, what self-check result is displayed on Operation Indicator lamp on the indoor unit? ❋1
Serial signal error is indicated. (0.5-sec.ON, 2.5-sec.OFF)
Mis-wiring is indicated.(0.5-sec.ON, 0.5-sec.OFF)
Is there mis-wiring, poor contact, or wire disconnection?
Yes
Repair wiring.
No
1. Turn OFF the power supply and disconnect in-out connecting wire on the indoor side.
2. Short-circuit between indoor terminal block N and 3.
3. Turn ON the power supply and press the EMERGENCY OPERATION switch.
Is there 20V DC between both ends of R132 when 52C contactor turns ON?
(By tester, the stylus is between 0 ~ 20V.)
No
Replace the indoor electronic control P.C. board.
Yes
1. Turn OFF the power supply.
2. Reconnect in-out connecting wire.
3. Turn ON the power supply.
3 minutes later, when the EMERGENCY OPERATION switch is pressed and 52C contactor turns ON, is there 220-240V AC between the outdoor terminal block 2-N ? ❋2
No
Rectify in-out connecting wire.
Yes
Is there 5V DC between J8 ⊖-J9 ⊕ on the outdoor DEICER P.C. board? ❋2
No
Check and rectify the fuse and the varistor on the outdoor DEICER P.C. board.
Yes
Is there 10V DC between both ends of R601? ❋2
(By tester, the stylus is between 5 ~10V)
No
Rectify in-out connecting wire.
Yes
Replace the outdoor DEICER P.C. board.

❋2 While the serial signal error is indicated, 52C contactor alternates ON for about 10 seconds and OFF for 3 minutes. Measure the voltage when 52C contactor is ON.

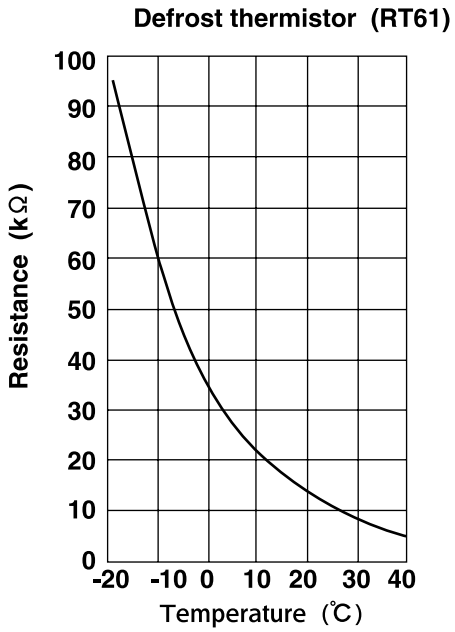
TEST POINT DIAGRAM AND VOLTAGE
MSH-18NV -E4

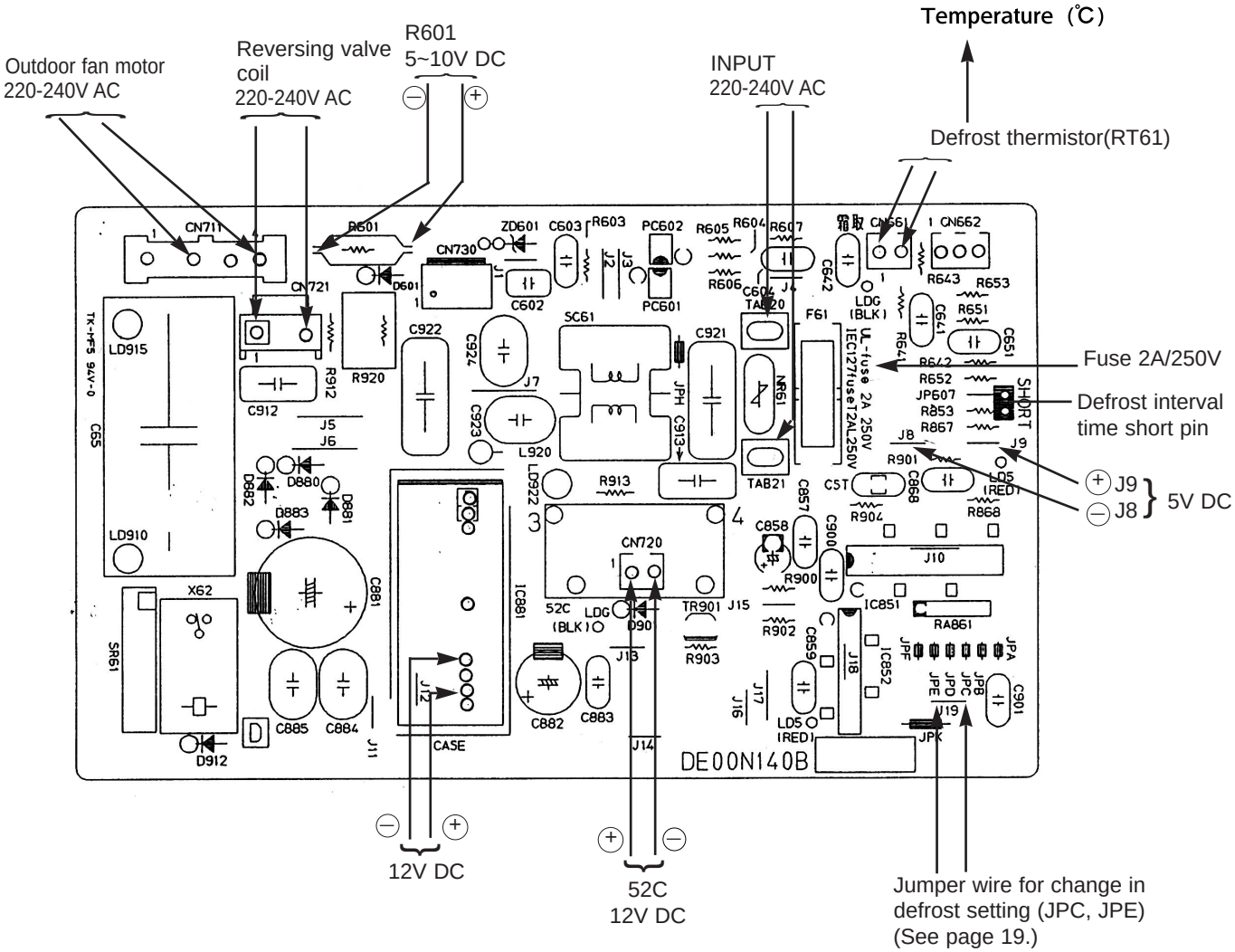






MUH-18NV -E4
Outdoor deicer P.C. board



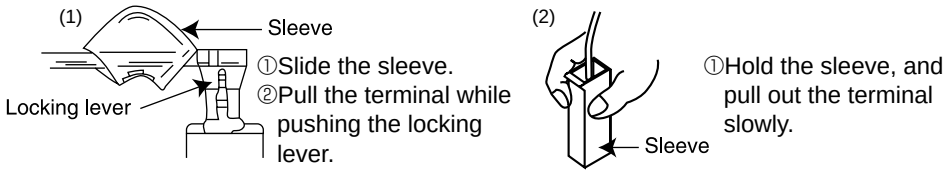


11 DISASSEMBLY INSTRUCTIONS

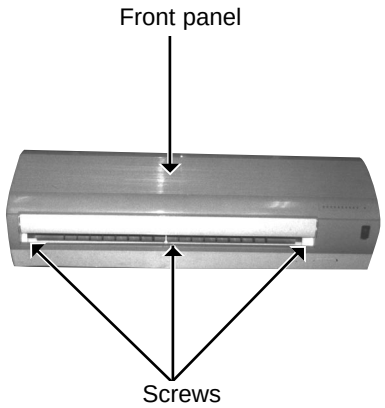
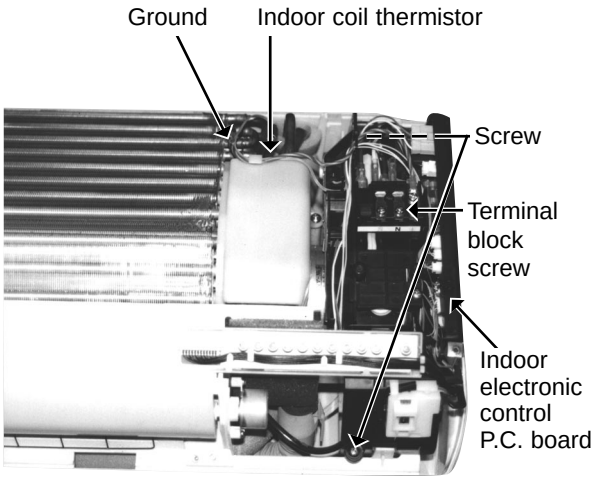
NOTE:

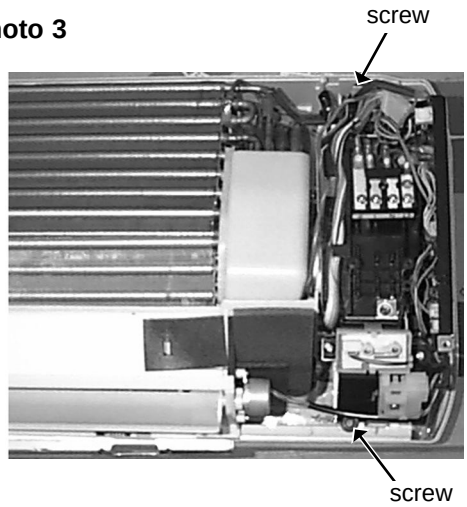
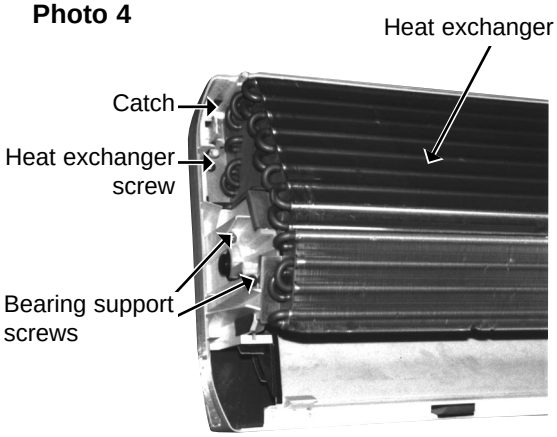
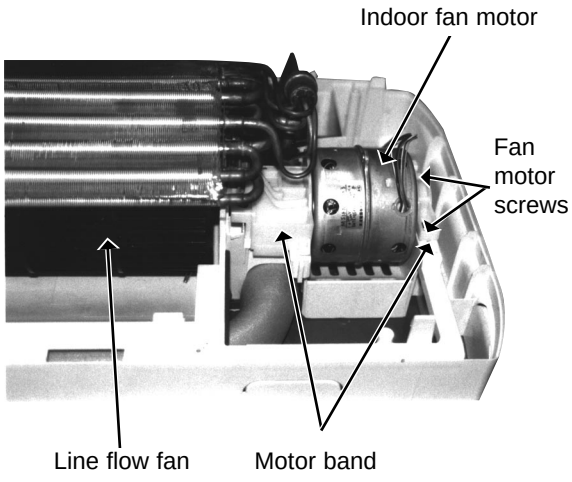
<"Terminal with lock mechanism" Detaching points>

In the case of terminal with lock mechanism, detach the terminal as shown below.

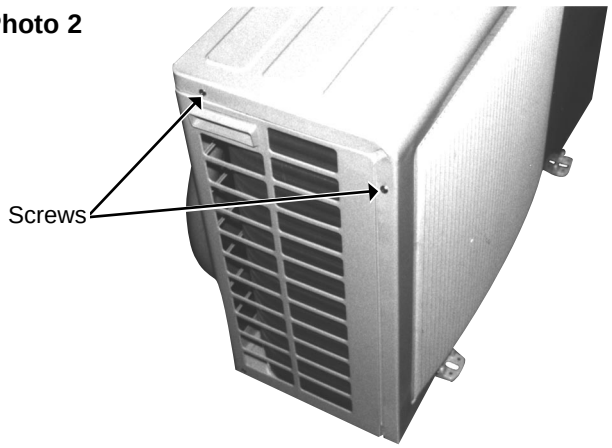
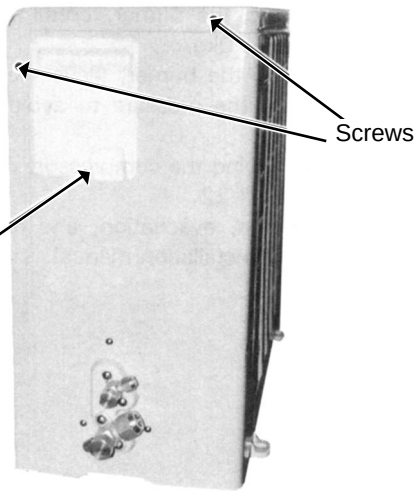
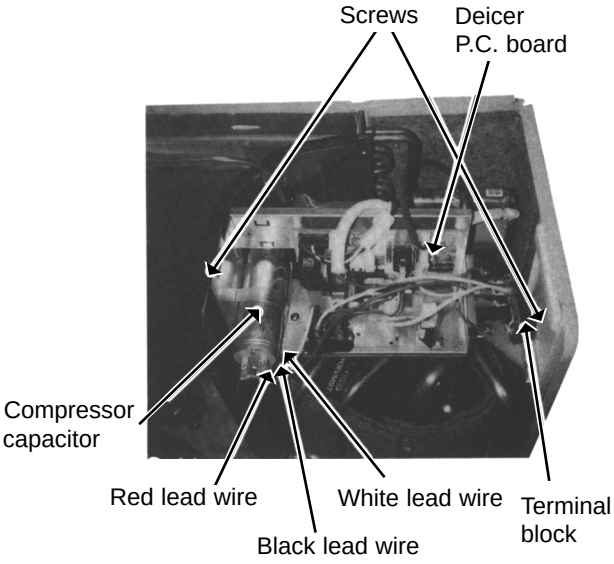


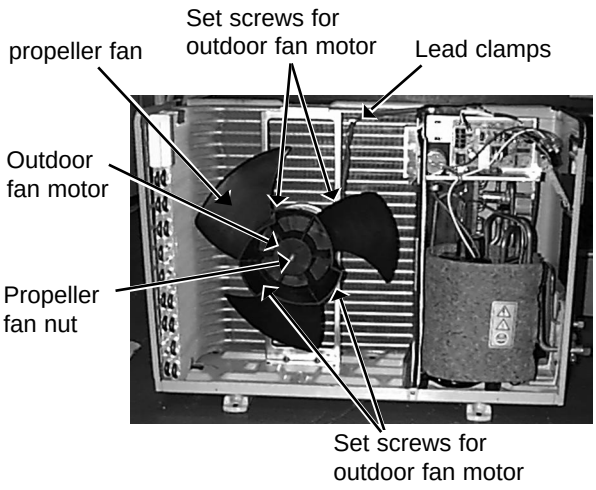
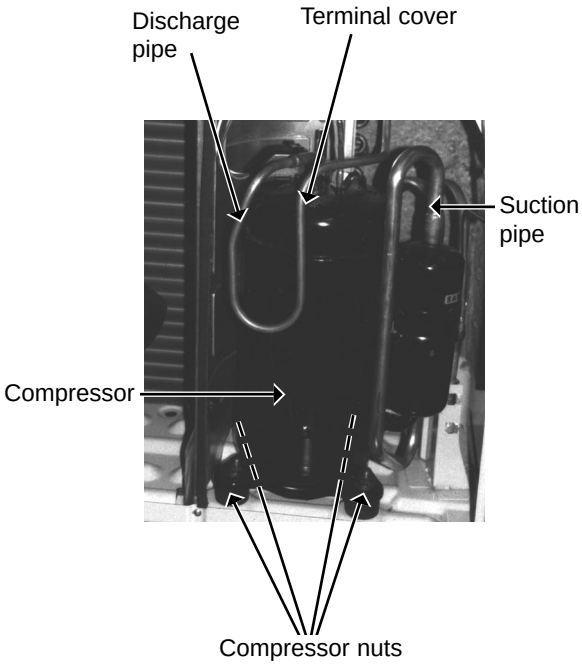
11-1. MSH-18NV - E4 INDOOR UNIT

OPERATING PROCEDURE	PHOTOS
1. Removing the front panel (1) Remove the screw caps at the down of the front panel. Remove the screws. (2) Pull the panel down to your side slightly and unhook the catches at the top.	**Photo 1** 
2. Removing the electronic control P.C. board (1) Remove the front panel. (Refer to 1) (2) Remove the electrical cover. (3) Remove the screw, remove the terminal cover. (4) Remove the screw of terminal block. (5) Unhook the catch of the lamp holder. (6) Remove the receiver holder. (7) Disconnect the connectors and the lead wire from 52C contactor on the electronic control P.C. board and remove the ground and the indoor coil thermistor. (8) Remove the electronic control P.C. board.	**Photo 2** 

OPERATING PROCEDURE	PHOTOS
3. Removing the electrical box (1) Remove the front panel. (Refer to 1) (2) Remove the electrical cover. (3) Disconnect the connector of the indoor coil thermistor. (4) Disconnect the motor connector (CN211 and CN121) and the vane motor connector (CN151) on the electronic control P.C. board. (5) Remove the screw of the electrical box, remove the electrical box.	**Photo 3** 
4. Removing the indoor fan motor and the line flow fan (1) Remove the front panel. (2) Remove the electrical box. (3) Unhook the catch on the both sides of the nozzle assembly. (4) Remove the nozzle assembly. (5) Remove the screws of the bearing support. (6) Remove the screw of the heat exchanger unhook the catch. (7) Lifting the heat exchanger, remove the bearing support. (8) Remove the motor support. (9) Loose the screw fixing the line flow fan, remove the line flow fan. (10) Remove the screws of the motor band, remove the fan motor.	**Photo 4**  **Photo 5** 

11-2. MUH-18NV - E4
OUTDOOR UNIT

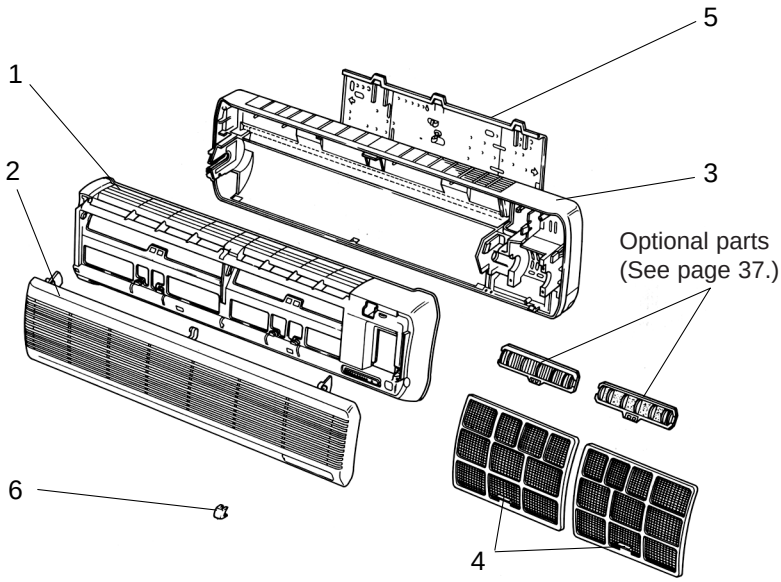
OPERATING PROCEDURE	PHOTOS
1. Removing the cabinet (1) Remove the screws of the cabinet. (2) Hold the down of the cabinet on the both side to remove the cabinet. **Photo 2**  	**Photo 1** 
2. Removing the deicer P.C. board (1) Remove the service panel and the cabinet. (2) Disconnect all the connectors and the terminals on the deicer P.C. board. (3) Remove the deicer P.C. board.	**Photo 3** 

OPERATING PROCEDURE	PHOTOS
3. Removing the outdoor fan motor (1) Remove the cabinet. (Refer to 1) (2) Disconnect the connector remove the clamp of fan motor lead wire. (3) Remove the propeller nut and remove the propeller fan. (4) Remove screws securing the fan motor.	**Photo 4** 
4. Removing the compressor (1) Remove the cabinet. (Refer to 1) (2) Remove the soundproof felt. (3) Remove the terminal cover on the compressor. (4) Remove the electrical assembly. (Refer to 2) (5) Release gas from the refrigerant circuit. (6) Disconnect the welded part of the discharge pipe. (7) Disconnect the welded part of the suction pipe. (8) Remove nuts fixing the compressor. (9) Remove the compressor.	**Photo 5** 

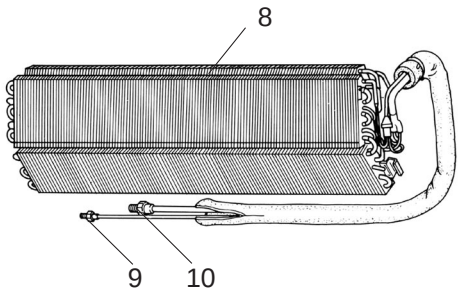
12 PARTS LIST

MSH-18NV -E4 (WH)

12-1. INDOOR UNIT STRUCTURAL PARTS



12-2. INDOOR UNIT HEAT EXCHANGER



12-1. INDOOR UNIT STRUCTURAL PARTS

Part number that is circled is not shown in the illustration.

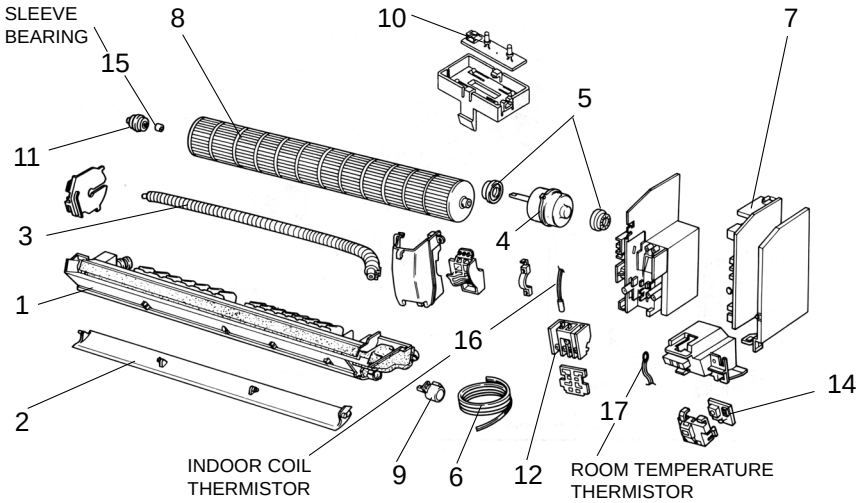
NO.	Part No.	Part Name	Symbol in Wiring Diagram	Q'ty/unit MSH-18NV- E4 (WH)	Remarks
1	E02 138 000	FRONT PANEL(WH)		1	
2	E02 138 010	GRILLE(WH)		1	
3	E02 143 234	BOX(WH)		1	
4	E02 141 100	AIR FILTER		2	
5	E02 141 970	INSTALLATION PLATE		1	
6	E02 143 067	SCREW CAP(WH)		3	3PCS/SET
(7)	E02 168 007	LAMP PANEL(WH)		1	

12-2. INDOOR UNIT HEAT EXCHANGER

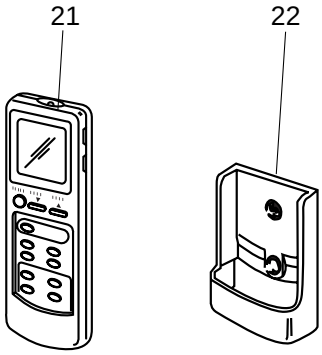
8	E02 141 620	INDOOR HEAT EXCHANGER		1	
9	E02 138 667	UNION(LIQUID)		1	ϕ6.35
10	E02 138 666	UNION(GAS)		1	ϕ15.88

MSH-18NV -E4 (WH)

12-3. INDOOR UNIT FUNCTIONAL PARTS AND ELECTRICAL PARTS



12-4. ACCESSORY PARTS AND REMOTE CONTROLLER



12-3. INDOOR UNIT FUNCTIONAL PARTS AND ELECTRICAL PARTS

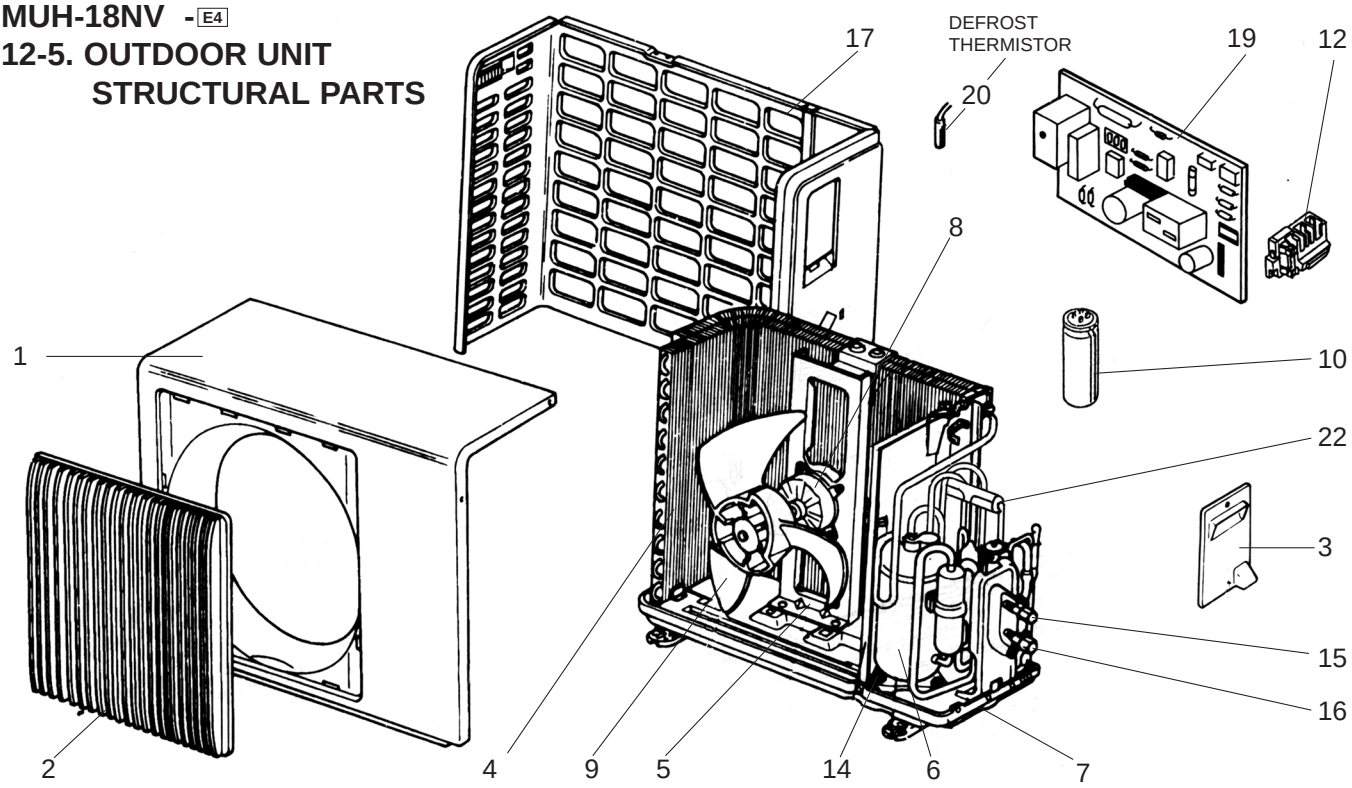
Part number that are circled are not shown in the illustration.

NO.	Part No.	Part Name	Symbol in Wiring Diagram	Q'ty/unit MSH-18NV- E4 (WH)	Remarks
1	E02 143 235	NOZZLE(WH)		1	
2	E02 143 040	VANE(WH)		1	
3	E02 141 702	DRAIN HOSE		1	
4	E02 141 300	INDOOR FAN MOTOR	MF	1	RA4V27 -□□
5	E02 001 505	FAN MOTOR RUBBER MOUNT		2	2PCS/SET
6	E02 138 395	POWER SUPPLY CORD		1	
7	E02 444 452	ELECTRONIC CONTROL P.C. BOARD		1	AUTO RESTART
8	E02 141 302	LINE FLOW FAN		1	
9	E02 141 303	VANE MOTOR	MV	1	
10	E02 138 329	DISPLAY P.C. BOARD		1	
11	E02 141 509	BEARING MOUNT		1	
12	E02 198 375	TERMINAL BLOCK	TB	1	
(13)	E02 336 385	VARISTOR	NR11	1	
14	E02 141 468	RECEIVER P. C. BOARD		1	
15	E02 001 504	SLEEVE BEARING		1	
16	E02 138 307	INDOOR COIL THERMISTOR	RT12	1	
17	E02 138 308	ROOM TEMPERATURE THERMISTOR	RT11	1	
(18)	E02 127 382	FUSE	F11	1	3.15A
(19)	E02 205 381	THERMAL FUSE	F12	1	93℃
(20)	E02 138 383	SURGE ABSORBER	DSAR	1	

12-4. ACCESSORY PARTS AND REMOTE CONTROLLER

21	E02 139 426	REMOTE CONTROLLER		1	
22	E02 141 083	REMOTE CONTROLLER HOLDER		1	

MUH-18NV -E4
12-5. OUTDOOR UNIT
STRUCTURAL PARTS

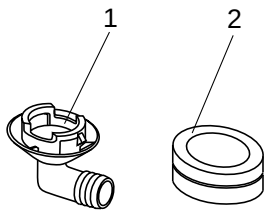


Part number that are circled are not shown in the illustration.

NO.	Part No.	Part Name	Symbol in Wiring Diagram	Q'ty/unit	Remarks
				MUH-18NV-E4	
1	E02 141 232	CABINET		1	
2	E02 141 521	GRILLE		1	
3	E02 141 245	SERVICE PANEL		1	
4	E02 139 630	OUTDOOR HEAT EXCHANGER		1	
5	E02 139 515	MOTOR SUPPORT		1	
6	E02 277 900	COMPRESSOR	MC	1	PH-36VPET
7	E02 277 290	BASE		1	
8	E02 144 301	OUTDOOR FAN MOTOR	MF	1	RA6V50 - □□
9	E02 141 501	PROPELLER FAN		1	
10	E02 277 353	COMPRESSOR CAPACITOR	C1	1	55μF/420V
⑪	E02 004 340	CONTACTOR	52C	1	
12	E02 198 374	TERMINAL BLOCK	TB	1	
⑬	E02 139 936	CAPILLARY TUBE		2	φ3.0Xφ1.6X750
	E02 064 936	CAPILLARY TUBE		1	φ3.0Xφ2.0X500
14	E02 138 506	COMPRESSOR RUBBER SET		4	4RUBBERS/SET
15	E02 139 662	STOP VALVE(LIQUID)		1	φ 6.35
16	E02 150 661	STOP VALVE(GAS)		1	φ15.88
17	E02 140 233	BACK PANEL		1	
⑱	E02 095 382	FUSE	F61	1	250V / 2A
19	E02 444 451	DEICER P.C. BOARD		1	
20	E02 440 310	DEFROST THERMISTOR	RT61	1	
㉑	E02 139 490	REVERSING VALVE COIL	21S4	1	
22	E02 444 961	REVERSING VALVE		1	
㉓	E02 128 383	SURGE ABSORBER	DSAR	1	
㉔	E02 214 642	CHECK VALVE		1	

MUH-18NV -E4

12-6. ACCESSORY PARTS



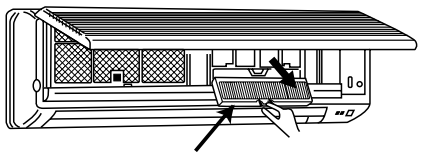
NO.	Part No.	Part Name	Symbol in Wiring Diagram	Q'ty/unit MUH-18NV-E4	Remarks
1	E02 444 704	DRAIN SOCKET		1	
2	E02 444 705	DRAIN CAP		2	ϕ33
3	E02 444 706	DRAIN CAP		1	ϕ16.2

13 OPTIONAL PARTS

13-1. AIR CLEANING FILTER

- AIR CLEANING FILTER removes fine dust of 0.01 micron from air by means of static electricity.
- Normal life of AIR CLEANING FILTER is 3 months. However, when it becomes dirty, replace it as soon as possible.
- Clogged AIR CLEANING FILTER may reduce the air conditioner capacity or cause frost on the air outlet.
- DO NOT reuse AIR CLEANING FILTER even if it is washed.
- DO NOT remove or attach AIR CLEANING FILTER during unit operation.

Model	Part No.
MSH-18NV-E4	MAC-1100FT

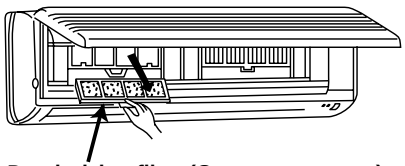


Air cleanig filter (White bellows type)

13-2. DEODORIZING FILTER

- DEODORIZING FILTER removes ammonia and hydrogen sulphide emitted from tobacco, and odor of pets.
- Clean DEODORIZING FILTER every two weeks. If the filter is particularly dirty, clean the filter more often.
- For cleaning, soak the filter in warm water for a while, and then wash and rinse it. Dry the filter in the shade thoroughly.
- When the filter color is still dark even after cleaning, replace the filter with a new one.
  Replace the filter at least once a year.

Model	Part No.
MSH-18NV-E4	MAC-1600DF



Deodorizing filter (Gray sponge type)

- DEODORIZING FILTER and AIR CLEANING FILTER can be attached on either side.

MITSUBISHI ELECTRIC CORPORATION
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